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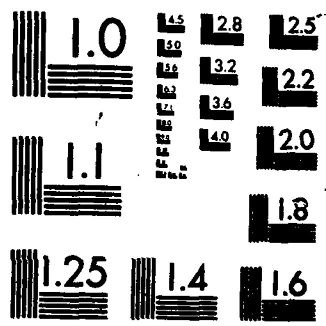

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OLD DOMINION UNIVERSITY RESEARCH FOUNDATION

ANNOTATED BIBLIOGRAPHY OF THE LOWER CHESAPEAKE BAY:

CURRENT LITERATURE OF BIOLOGICAL, CHEMICAL, GEOLOGICAL AND PHYSICAL STUDIES

Research Co-ordinator:

Arthur Butt
Applied Marine Research Laboratory

Principal Investigators:

John Ludwick
Ron Johnson
Terry Wade
David Feigenbaum

Researchers:

Dennis Lundberg
Eric Stern
Kathy McCormick

Department of Oceanography
Old Dominion University
Norfolk, Va.

Prepared for
The Army Corps of Engineers, Norfolk District, Virginia
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Submitted by the
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P.O. Box 6396
Norfolk, VA 23508

US Army Corps
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Norfolk District

Report B-9

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CURRENT LITERATURE OF BIOLOGICAL, CHEMICAL, GEOLOGICAL AND PHYSICAL STUDIES

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Norfolk, VA 23508

TABLE OF CONTENTS

BIOLOGICAL ANNOTATIONS

by
Kathleen M. McCormick

This report is composed of a series of references on the biota of the lower Chesapeake Bay area. The study site is delineated by the coordinates 36 50′N,37 10′N,75 50′W,76 20′W.

The citations of the biota of the lower Chesapeake Bay were sectioned into 8 categories. In each category they were listed in order of most recent to oldest.

A. Benthic
B. Sea Grasses
C. Plankton (phyto-, holo-, and mero-)
D. Nekton
E. Miscellaneous (bacteria, parasites and fungi)
F. Pollution
G. Ecology
H. Taxonomy

Plankton is a general term applied to plants (phytoplankton) and animals (zooplankton) that passively drift with water movements. The zooplankton may further be divided into the holo- (animals that spend their entire life as a plankter such as copepods) and meroplanters (generally larval stages to aquatic animals that spend only a portion of their life drifting). Many commercial species of shellfish fall in this later category. Nekton are pelagic forms, particularly fishes, that do not passively drift but are able to swim against water currents.

The following data bases were searched by computer and the appropriate references were selected: Biosis(1973-date); Sci Search(1981-date); GPO(1968-date); NTIS(1976-date); CA Search(1972-date).

Biosis contains citations from both Biological Abstracts and Biological Abstracts/RRM. These constitute comprehensive worldwide coverage of research in the life sciences.

Sci Search contains all records published in Science Citation Index.

GPO is the catalog of the United States Publications. It contains records of reports, studies, fact sheets, conference proceedings, etc...issued by all U.S. federal government agencies.

NTIS is the National Technical Information Service. Its database consists of government-sponsored research, development, and engineering plus analysis prepared by federal agencies, their contractors or grantees.

CA Search contains basic bibliographic information appearing in the printed *Chemical Abstracts*.

M.S. theses and Ph.D. dissertations from both Old Dominion University and Virginia Institute of Marine Science were searched.

Gray literature was made available through loans by Dr. D.L. Feigenbaum, Dr. R Alden, Dr. R.S. Birdsong, A. Butt, and Virginia Institute of Marine Science.

Benthic studies have received the greatest attention in the lower Chesapeake Bay during recent years. This is expected due to interests in commercial shellfish (i.e. oysters, Crassostrea virginica, and hard clams, Mercenaria mercenaria) and environmental studies associated with community structures in stressed estuarine environments. Also, many benthic forms and their larval stages serve as major food sources to numerous local commercial and recreational fishes. It is apparent that the Bay serves as a major nursery ground for many estuarine and coastal fish species, many of economic value; however, life history studies of many species in the lower Bay are wanting. From a fisheries standpoint, little is known of yield estimates in the lower Chesapeake Bay. All landing statistics encompass several "harvest contrl zones" that border on the lower Bay; however, little is known about which commercial fish species are caught directly in the study area in question, or their catch abundance.

Andrews, J. D. (1983) Minchinia nelsoni (MSX) infections in the James River seed oyster area and their expulsion in spring: Estuarine Coastal and Shelf Science 16(3) 255-269.

A new oyster disease caused by Michinia nelsoni (MSX) in lower Chesapeake Bay was spread in the lower half of the seed area in the James River in 1959-1960. Low salinities inhibit the development of infections, with minimal infections occurring where salinities do not exceed 15-20 ppt in late summer and fall. The oysters expel the pathogen in early spring, usually in areas of <10 ppt salinity.

Citation B001

Hawthorne, S. D., Dauer, D. M. (1983) Macrobenthic communities of the lower Chesapeake Bay. III. Southern Branch of the Elizabeth River: Int Revue ges Hydrobiol 68:193-205.

Macrobenthic invertebrates were studied seasonally at five stations along the Southern Branch of the Elizabeth River in order to determine community structure associated with measured sediment and water quality parameters of an industrialized seaport ecosystem. Spatial homogeneity was high throughout the Southern Branch. Changes in the benthic community due to sediment alteration from dredging was insignificant. Severe stresses induced by man's activities is probably the only factor which could affect eurytipic species of the benthic community.

Citation B002

Dauer, D.M., Stokes, T.L., Barker, H.R., Ewing, R.M., Sourbeer, J.W. (1983) Macrobenthic communities of the lower Chesapeake Bay. IV. Baywide transects and the inner continental shelf: Int Revue ges Hydrobiol 68.

Benthos of the lower bay were sampled on two bay-wide transects in June 1978. The benthos of the inner shelf was sampled five times a year from 1979 through 1981. These samples were taken in order to study the distribution, abundance and species composition of subtidal macrobenthic invertebrates of the lower bay and inner continental shelf off the mouth,and compare them to data from previous studies of estuaries and the inner shelf of the mid-Atlantic Southeastern U.S. Qualitative comparisons of the present data with past studies of the lower Chesapeake Bay indicate that most density dominants have remained the same. Because of differences in collection methods, qualitative comparisons are not possible. Distribution of estuarine macrobenthos shows that most species can be classified as restricted to sand sites or ubiquitous with respect to sediment type. Also variation in sediment type affects benthic distributions more near the mouth of the estuary with salinity more important in the upper portion of the estuary.

Citation B002.1

Tourtellotte, G.H., Dauer, D.M., (1983) Macrobenthic communities of the lower Chesapeake Bay. II. Lynnhaven Roads, Lynnhaven Bay, Broad Bay, and Linkhorn Bay: Int Revue ges Hydrobiol 68(1):59-72.

The distribution of macrobenthic fauna were examined from 96 grab samples at 16 sites in a small coastal basin of lower Chesapeake Bay. Inlet-shoal sites, Linkhorn Bay site, the Narrow site, Tidal Creek mud sites and Lynnhaven Roads site were the five sites which classified the dominant species according to sediment distribution. Species diversity was highest in fine sands found in the Narrows and Lynnhaven Roads sites. The dominant organisms of these sites were found over a wide range of sediment types, whereas dominant organisms of clean sands were restricted to this type of sediment found at the Inlet-shoal site.

Citation B002.2

Dauer , D. M., Ewing, R. M., Sourbeer, J. W., Harlan, W. T., Stokes, T. L., Jr. (1982) Nocturnal movements of the macrobenthos of the Lafayette River, Virginia: Int Revue ges Hydrobiol 67(6): 761-775.

The nocturnal movements of the macrobenthic invertebrates of the Lafayette River, Norfolk, Virginia were studied between January 1980 and March 1981. Forty-four taxa of invertebrates were identifaied from the surface and bottom plankton tows that were collected. There was a net export of 1.08×10^6 individuals and 46.6 kg (dry weight) per day. This net export represents 35% of the total individuals in the entire Lafayette River, but 39.7% of the standing crop on an annual basis.

Citation B003

Kendell, P. C., Haven, D. S. (1982) A study of leased oyster ground at the site of the proposed route 143 bridge across Hampton River: conducted for the VA Dept. of Hwys. & Transp. Projecta 0143-114-102, RW-201.

The Virginia Institute of Marine Science conducted a study of leased oyster planting ground in the vicinity of the proposed Route 143 Bridge across Hampton River in order to determine if conditions were satisfactaory for oyster and hard clam growth.

Citation B004

Otsuka, C. M., Dauer, D. M. (1982) Fouling community dynamics in Lynnhaven Bay Virginia USA: Estuaries 5(1): 10-22.

Fouling community development was studied at Channel Points, Lynnhaven Bay, with the use of acrylic panels. The effects of predator exclusion and panel area on community development were studied once panel treatments were devised. Tharies 5(1): 10-22.

Fouling community development was studied at Channel Points, Lynnhaven Bay, with the al availability, ability to resist direct larval invasion and the ability to resist lateral overgrowth by post-larval individuals or colonies. *Balanus* has an extended period of larval availability and is thus the initial primary space dominant of the community.

Citation B005

Dauer, D. M., Ewing, R. M. (1982) Predation resource limitation and the structaure of benthic infaunal communities of the Lower Chesapeake Bay USA: Int Rev Gesamten Hydrobiol 67(4).

An in situ experiment was conducted in order to study the regulatory role of predation and food limitation on population levels of benthic macrofauna and meiofauna in the Lower Chesapeake Bay. Large predators were excluded from certain areas while organically enriching caged and uncaged plots. The hypothesis of food limitation for the benthos in the study area is strongly rejected. Species showing the greatest increases within predator exclusion cages were also the dominants in the natural community. High reproductive potentials with extended periods of recruitment were found in species with inefficient refuges from predation, therefore making them more likely to be abundant in natural communities.

Citation B006

Ewing, R. M., Dauer, D. M. (1982) Macrobenthic communities of the Lower Chesapeake Bay USA 1. Old Plantation Creek, Kings Creek, Cherystone Inlet and the adjacent offshore area benthic studies of the Lower Chesapeake Bay 4: Int Rev Gesamten Hydrobiol 67(6).

A survey of the benthic macrofauna community based on species composition was studied on the lower Delmarva Peninsula near Cape Charles, Virginia. Samples were taken at 26 sites along transects in Old Plantation Creek, Kings Creek, Cherrystone Inlet and the adjacent offshore areas. Species found in the offshore site showed an increased abundance and evenness and a distinct faunal assemblage in the sand-bottom habitat. Near shore species were adapted to a life in the shifting sands of the narrow shoal outside tidal creeks. The tidal creek sites held species associated with abiotically stressed and polluted environments. The number of individuals is greatest in the finer sediments of the tidal creeks, decreasing in number with distance offshore.

Citation B007

Dauer, D.M., Tourtellotte, G.H., Ewing , R.M. (1982) Oyster shells and artificial worm tubes: the role of refuges in structuring benthic communities of the lower Chesapeake Bay: Int Revue ges Hydrobiol 67(5):661-667.

Broad Bay was studied for the effects of spatial refuges upon the structure of infaunal and epifaunal macrobenthic and infaunal meiobenthic communities. Artificial clumps of tubes and oysters were used for spatial refuges. These had significant treatment effects upon total number of macrofaunal densities with a single exception. The total number of macrofaunal species was generally higher in treatments compared to controls. The total number of nematodes and harpacticoid copepods in treatments were usually higher than control levels, but lower below oyster clumps. This is possibly due to anoxic conditions at or near the sediment surface.

Citation B007.1

Erkenbrecher, C. W. (1981) Sediment bacterial indicators in an urban shellfishing Sub-estuary of the lower Chesapeake Bay: Applied and Environmental Microbiology 42(3): 484-492.

Spatial and temporal distributions and compositions of bacteria in the sediments and overlying waters of the Lynnhaven estuaries urban shellfishing area were studied. Higher salinity and coarser sediment of the inlet site showed low bacterial densities as compared to the headwater sites characteristic of freshwater runoff and decreased tidal action. Sources of bacterial pollution appeared to be urban and agricultural runoff and possibly failure of septic tank systems in the Lynnhaven western branch, causing potential health hazards.

Citation B008

Kendell, P. C., Haven, D. S. (1981) The shellfish resource in the vicinity of the proposed bridge tunnel for I-664-conducted for the VA Dept. of Hwys. & Transp: projects 0664-121-102,RW201 and 0664-061-102,RW201.

A study of the shellfish resource in the Hampton Roads area was conducted by the Virginia Institute of Marine Science. Densities of the hard clam populations were determined along with their estimated value.

Citation B009

Dauer, D. M., Maybury, C. A., Ewing, R. M. (1981) Feeding behavior and general ecology of several spionid polychaetes from the Chesapeake Bay USA: J Exp Mar Biol Ecol 54(1).

The feeding behavior of six species of spionid polychaetes were observed in the Lower Chesapeake Bay. The areas which were studied include the Lafayette River, the mouth of the Lynnhaven River and the entrance of the Bay itself. All species fed on both suspended and deposited particles and increased their feeding rate in the presence of a current transporting suspended particles. The availability of food along with competitive interactions affected small-scale movements of individuals.

Citation B010

Bertness, M. D. (1980) Growth and mortality in the ribbed mussel Geukensia demissa: Veliger 23(1): 62-69.

Patterns of decreasing shell size along an estuarine salinity/temperature gradient are shown in the studies conducted on the mussel, G. demissa. Increased longevity and decreasing growth rates are observed with distance from the open coast up into the estuarine environment.

Citation B011

Haven, D. S. (1979) A report on molluscan populations in the vicinity of the Little Creek sewage outfall: Hampton Roads Sanitation District Commission (Appendix VII).

No annotation.

Citation B012

Seymour, C. P. (1979 Animal-sediment relationship study of the Western branch of the Lynnhaven River: M.S. ODU, Dr. Daniel M. Dauer, Chairman.

Benthic macroinvertebrates were collected from 6 stations in the Lynnhaven River. Six species dominated all of the sites sampled with the greatest number of individuals, biomass and species being located at the sand sites. Species diversity, richness and evenness were similar in value between all sand and mud sites.

Citation B013

Goy, J. W., Provenzano, A. J., Jr. (1978) Larval development of the rare burrowing mud shrimp Naushonia crangonoides decapoda thallassinidea laomediidae: Biol Bull (Woods Hole) 154(2):L 241-261.

N. crangonoides larvae were captured from plankton near the mouth of Chesapeake Bay. They were raised in the laboratory in order to determine the identity of the species by its larval stages. A redescription of the larval development of N. crangonoides and a review of larval characters in the family Laomediidae is provided in this report.

Citation B014

Virnstein, R. W. (1977) The importance of predation by crabs and fishes on benthic infauna in Chesapeake Bay: Ecology 58(6): 1199-1217.

A study of the significance of large motile predators in controlling the distribution and abundance of the macrobenthic invertebrates within the sediments in a shallow subtidal sand community was conducted. Experiments showed that infaunal communities are an important food source for predator species important to man.

Citation B015

Haven, D. S., Kendall, P. C., Phoel, W. C. (1977) A study of leased oyster grounds adjacent to the James River Bridge, Newport News, VA: conducted for VA Dept Hwys & Transp Proj 0017-046-102,RW201.

The Virginia Institute of Marine Science conducted a study of the river bottom on the site of the original James River Bridge in order to assess the impact of the bridge removal activities and to quantify the magnitude of oyster stocks and their economic value.

Citation B016

Neilson, B. J. (1976) A report to the Hamptoon Roads Water Quality Agency: Special Report No. 129 in Applied Marine Science and Ocean Engineering.

The areas studied in the report include the Back and Poquoson Rivers on the Virginia Peninsula, Little Creek Harbor, and the Lynnhaven Bay system on the southern shore of Chesapeake Bay. Listed in Appendix C are the shellfish condemnation areas of the four locations which are closed due to bacterial contamination.

Citation B017

Boesch, D. F., Diaz, R. J., Virnstein, R. W. (1976) Effects of Tropical Storm Agnes on soft-bottom macrobenthic communities of the James and York estuaries and the lower Chesapeake Bay: Ches Sci 17:246-

A study was conducted on the macrobenthos at 58 stations in the James and York estuaries and the lower Chesapeake Bay, in order to determine the effects of decreased salinity and oxygen caused by the tropical storm Agnes. The effects were greatest in the lower, polyhaline portions of the James and York estuaries. Many abundant species of the shallow bottom were killed due to reduced salinity and low oxygen concentrations which were caused by strong density stratification of the water masses. Communities from oligohaline or tidal freshwater regions of the James and York plus those at the mouth of the bay were not noticeably affected by Agnes.

Citation B018

Bates, J. M., Jr. (1976) Effect of the Chesapeake-Elizabeth sewage outfall, Va. Beach, VA on the distribution and ecology of benthic foraminifera: M.S. thesis ODU, Dr. Randall S. Spencer, Chairman.

Sediment and bottom water samples were collected at the Chesapeake Sewage outfall, determining the effect it had on benthic foraminifera. Living foraminiferal density increased with distance from the immediate vicinity of the outfall, showing variability by temporal variation. Species diversity was highest at the outfall in both living and total populations, however the number of living and total species was lowest in this area. Temperature was seasonally related to living foraminiferal density, while sediment grain size showed a significant areal correlation with living foraminiferal density.

Citation B019

Shedrow, C. B. (1975) Microbenthic algal production of an intertidal sandflat in Little Creek Harbor, Va. Beach, VA: M.S. thesis ODU, Dr. Anthony J. Provenzano, Chairman.

The productivity of microbenthic algae of an intertidal sandflat on Little Creek Inlet was determined. The effects of various factors such as temperature and salinity are shown in the photosynthetic efficiency of the algal community. Productivity was greatest during the summer and fall periods, varying directly with water temperature and standing crop of diatoms, and inversely with incident solar radiation and standing crops of sedimentary chlorophyll "a" and "c". The season of greatest growth and development was during the fall period.

Citation B020

Andrews, J. D. (1973) Effects of tropical storm Agnes on epifaunal invertebrates in Virginia Estuaries: Ches Sci 14(4): 223-234.

The large input of freshwater into the Chesapeake Bay and its river basins were shown to effect the epifaunal invertebrates in these waters. This report describes the changes thatpans, seasonal fluctuations in abundance and pelagic larvae showed strong capabilities of recovery. Mesohaline species, which were more decisively displaced and eliminated than oligohaline species, are less adapted for quick recovery. Normal distributions and abundances should be followed as the epifaunal invertebrates recover.

Citation B021

Boesch, D. F. (1973) Classification and Community Structure of Macrobenthos in the Hampton Roads Area, Virginia: Marine Biology 21, 226-244.

Benthic macrofauna were collected at 16 stations in Hampton Roads and the adjacent Elizabeth River. The type of sediment from which they came was used to determine their community structure. Species groupings distinguished a few species most frequent at Elizabeth River or mud and muddy-sand sites, larger numbers of species restricted to muddy-sand and sand or solely to sand sites, ubiquitous species, epifaunal species which were microhabitat restricted, and seasonal species. At Elizabeth River and mud stations, diversity increased from February to August because of increased evenness, while at sand and muddy-sand stations, diversity peaked in May in response to both high species richness and high evenness.

Citation B022

Boesch, D. F. (1971) Distribution and structure of benthic communities in a gradient estuary: Ph.D. Dissertation at VIMS, Marvin L. Wass, Chairman.

The long and stable gradient formed from the lower Chesapeake Bay to the York and Pamunkey Rivers was sampled for macrobenthos of soft-bottoms. Their distribution and structure according to varied salinities were analyzed.

Citation B023

Also see the following citations:

C016, C058, C059

Wetzel, R. L., Penhale, P. A. (1983) Production ecology of sea grass communities in the lower Chesapeake Bay: Marine Technology Society Journal 17(2):22-31.

No annotation

Citation B024

Information on the submerged aquatic macrophyte communities can be found in several reports that were done by Robert J. Orth from the Virginia Institute of Marine Science.

Orth, R. J., van Montgrans, J. (1983) Biology of submerged auqatic communities in the lower Chesapeake Bay. Volume 3. Interactions of resident consumers in a temperate estuarine sea grass community: Vaucluse Shores, Virginia: Report No. EPA-600/3-83-047.

The main area studied in the lower Chesapeake Bay was the large grass bed at the Vaucluse Shores on the bay side of Virginia eastern shore. The ecology of resident consumers was dealt with in this report.

Citation B025

Orth, R. J., Moore, K. A., van Montfrans, J. (1983) Submerged aquatic vegetation: distribution and abundance in the lower Chesapeake Bay and the interactive effects of light, epiphytes, and grazers: Report No. EPA-600/3-83-019.

Distribution and abundance of submerged aquatic vegetation was described along with maps of the areas studied.

Citation B026

Orth, R. J., Moore, K. A. (1982) The biology and propagation of Zostera marina: eelgrass in the Chesapeake Bay, Virginia: Report No.: 265; EPA-600/3-82-090.

The growth and propagation of eelgrass was studied in order to reveal information on seasonal aspects of standing crops.

Citation B027

Orth, R. J. (1982) Distribution and abundance of submerged aquatic vegetation in the Lower Chesapeake Bay, Virginia: Technical Report No.: EPA-600/5-8-79-029.

No annotation.

Citation B028

Davies, T. T. (Director of CBP) (1982) Chesapeake Bay program technical studies: a synthesis: Chesapeake Bay Program Report.

The EPA initiated a five year study of the Chesapeake Bay. One of the three areas of intensive investigation is the decline of submerged aquatic vegetation. The location of the area of most concern to this literature search is Hampton Roads in the James River. This report summarizes and integrates approximately three years of research on the occurrence of submerged aquatic(SAV), the role and value of SAV in the Bay's ecosystem, and major factors controlling SAV's past and future survival.

Citation B029

Heck, K. J., Jr., Orth, R. J. (1981) Structural components of eelgrass Zostera marina meadows in the lower Chesapeake Bay decapod crustacea: Estuaries 3(4): 289-295.

The abundance of several species of decapod crustaceans was correlated with plant biomass throughout the year (1976-1977) that they were studied. Decapod densities were greater on vegetated bottoms than on unvegetated bottoms. Decapod were also more abundant at night on the vegetated bottom as opposed to
daytime abundance on the bottom.

Citation B030

Orth, R. J., Heck, K. L., Jr. (1981) Structural components of eelgrass Zostera marina meadows in the lower Chesapeake Bay fishes: Estuaries 3(4): 278-288.

A study of the structure of the fish community associated with eelgrass beds in the lower Chesapeake Bay showed 48 species to be found. Seasonal changes in abundance of the fish were observed. The density and diversity of fishes were higher in vegetated areas compared to unvegetated areas. The fishes were also more abundant in night collections. In the spring and early summer, fish abundance and species increased with increasing water temperature and eelgrass biomass. In winter fish species and abundance decreased with decreasing water temperature and eelgrass biomass.

Citation B031

Also see citation B079

Marshall, H. G. (1982) The composition of phytoplankton within the Chesapeake Bay plume and adjacent waters off the Virginia coast USA: Estuarine Coastal Shelf Sci 15(1): 29-44.

The composition differences in the phytoplankton located at the mouth of the bay and along the continental shelf, were used to identify and plot the extent of the Chesapeake Bay plume. Seasonal (spring, early summer and fall) differences in these phytoplankton assemblages, used to identify the water outflow, were found for March, June and October and are listed in table 2. The flow pattern of water from the Chesapeake Bay over the shelf is southward, moving as a narrow band along the Virginia and North Carolina coasts.

Citation B032

Marshall, H. G. (1980) Seasonal phytoplankton composition in the lower CAhesapeake Bay and Old Plantation Creek Cape Charles, Virginia, USA: Estuaries 3(3): 207-216.

A study of the phytoplankton in the lower Chesapeake Bay was conducted over a 14-month period, showing greater species diversity within the Bay samples than those from Old Plantation Creek. Seasonal patterns for the 219 phytoplankters showed maximum numbers of individuals present during the fall and spring months with a decline during the winter. Table 1 shows the species sampled and their abundances in the different seasons.

Citation B033

Purcell, T. (1973) Phytoplankton succession in the Lafayette River estuary Norfolk, VA: M.S. Thesis ODU, Dr. Harold Marshall, Chairman.

The composition and successional patterns of phytoplankton in the Lafayette River was determined in this study. Environmental parameters were measured and seasonal variations were shown. The period of population growth occurs in the spring with diatom species dominating first, then other diatoms and phytoflagellates appearing. Seasonal maximum occurs in April and minimum levels in June with phytoflagellates dominating the population. Water temperatures of 20°C appear to be important to many of the phytoplankton in the Lafayette River. Phytoflagellates prefer the brackish water further upstream while diatom species favor the more saline waters closer to the mouth of the river.

Citation B034

Bryan, B. B. (1983) The diurnal reproductive cycle of Evadne tergeatina claus (Cladocera,Podonidae) in Chesapeake Bay: in press.

No annotation.

Citation B035

Feigenbaum, D., Kelly, M. (1982) The effect of sea nettle abundance on lower levels of the Chesapeake Bay food chain: manuscript in preparation.

Four levels of the food chain in the Chesapeake Bay were monitored twice a week between the periods of May 10 through September 30, 1982. The interactions between the species during the summer months were studied as were their distributions and abundances.

Citation B036

Bryan. B. B. (1979) The diurnal reproductive cycle of Evadne tergestinacladocera podonidae in Chesapeake Bay USA: Crustaceana (Leiden) 36(3): 229-236.

Day and night samples were taken at scattered locations in southern Chesapeake Bay in order to collect E. tergestina for studies concerning its reproductive cycle. The young were released from the brood chamber just before dawn as was observed from collections taken at the end of August. It molts for the first time the following morning. When it is two days old it releases its own first brood of young. Reproduction occurs parthenogenetically during favorable periods and sexually during unfavorable periods.

Citation B037

Gilchrist, S. L. (1979) Feeding morphologies and distribution patterns of marine cladocera in the lower Chesapeake Bay: M.S. Thesis ODU, Dr. A. J. Provenzano, Chairman.

The distribution of the marine cladocera species was studied in relation to temperature and salinity, and feeding abilities were predicted by the use of theoretical mathematical principles. This study was conducted over a year-long sampling period so that a total evaluation could be made for the spatial and temporal distributions of the cladocera. Temperature and salinity were primary factors influencing the spatial distribution of cladocerans seasonally in the Chesapeake Bay, having their lower temperature tolerance at 13° C and their upper salinity tolerance at 34.8 ppt. During the period from July to August, Bay cladoceran species overlap both temporally and spatially. This is the period of peak population density,and shows a possible competitive factor in distribution patterns.

Citation B038

Grant, G. C., Olney, J. E. (1979) Lower bay zooplankton monitoring program: an introduction to the program and results of the initial survey of March 1978:Special Scientific Report No. 93.

A study of the zooplankton in the lower Chesapeake Bay was conducted during March 1978 when winter-spring populations were at peak levels. Subsurface and neuston collections showed over ninety species of zooplankton. Five of the stations covered were in the area of interest in the lower Bay.

Citation B039

Jacobs, F. (1978) Zooplankton distribution, biomass, biochemical composition and seasonal community structure in lower Chesapeake Bay: Dissertation UVA, George C. Grant, Chairman.

The composition, distribution, biomass and biochemical constsituents of the zooplankton from the lower Chesapeake Bay were determined monthly for two years beginning August 1971. Four dominant major groups were determined from the 53 species collected. These were used to characterize four distinct geographical cluster zones.

Citation B040

Grant, G. C. (1977) Seasonal distribution and abundance of the Chaetognatha in the lower Chesapeake Bay: Estuar Coast Mar Sci 5:809-824.

Five species of Chaetognatha were found to occur in the lower Chesapeake Bay. These species were studied monthly over a two year period, showing seasonal abundances and distribution. Two seasonal groups were found to occur in the Chesapeake Bay, with one group being a winter inhabitant while the other occurs during the summer and fall months. Temperature decreases eliminated the summer-fall species, and increased water temperatures above 20^{o} C eliminated the winter-spring species.

Citation B041

Bryan, B. B. (1977) The ecology of the marine Cladocera of lower Chesapeake Bay: Ph.D. dissertation, UVA.

No annotation.

Citation B042

Crandall, D. E. (1974) Seasonal composition of zooplankton in the Lafayette River, Norfolk, Virginia: M.S. thesis ODU, H. G. Marshall, Chairman.

This study was conducted in the Lafayette River to determine zooplankton distribution and abundance over a yearly cycle. Copepods were emphasized.

Citation B043

Browne, M. E. (1974) Quantitative and qualitative seasonal analysis of the surface zooplankton of Magothy Bay, Virginia: M.S. thesis, ODU.

A study on the zooplankton in Magothy Bay showed populations to be low during the fall and winter and peak in late spring and late summer. Further mention is made of the different species associated with the peaks.

Citation B044

Bryan, B. B. (1974) The occurrence of _Podon intermedius_ in Chesapeake Bay, a new distributional record: Ches Sci 15(2): 120-121.

Zooplankton samples collected monthly from August 1971 to July 1973 at randomly selected stations in lower Chesapeake Bay found the planktonic microcrustacean _Podon intermedius_, which was not previously reported from the Chesapeake Bay. Maximum abundance was 23 individuals per m^3. All specimens examined were parthenogenetic females with the exception of one.

Citation B045

Atkinson, E. W. (1973) Seasonal composition of zooplankton of the lower Chesapeake Bay and Virginia coastal waters: M.S. thesis ODU, Dr. Harold G. Marshall, Chairman.

The purpose of this study was to indicate zooplankton distribution and abundance in relation to salinity and temperature. The development of a key to the dominant species of zooplankton, copepods, was also completed for the lower Chesapeake Bay. Total zooplankton volume was highest in the fall. Copepods formed the major part of the catch with concentrations lowest during the summer and increasing to maximum numbers in the fall. Volumes decreased in January, but increased again in the spring. _Mnemiopsis leidyi_ consumed most zooplankton forms generally found in June.

Citation B046

Bryan, B. B., Grant, G. C. (1973) Distribution of cladocera in lower Chesapeake Bay: Va J Sci 24(3): 131.

A survey of the Cladocera species was conducted in the lower Chesapeake Bay. Cladocerans seasonally form a significant part of the zooplankton in the lower Bay. _Podon polyphemoides_ is persistant throughout the year, with a peak in May. _Evadne_ and _Penilia_ species, from the continental shelf, are less common in the bay. They reached a maximum abundance in the lower bay during August of 1971.

Citation B047

Calder, D. R. (1971) Hydroids and hydromedosae of southern Chesapeake Bay: Bull Bur Fish 46(1091): 277-381.

A survey was conducted in the southern Chesapeake Bay and its tributaries from April 1965 through March 1968 to determine the species of hydrozoans present, their seasonality and reproductive periodicities.

Citation B048

Olney, J. E. (1983) Eggs and early larvae of the bay anchovy, _Anchoa mitchilli_ and the weak fish, _Cynoscion regalis_, in lower Chesapeake Bay with notes on associated ichthyoplankton: Estuaries, V6, N1, P20-35.

Collections of plankton taken from the lower Chesapeake Bay were used to determine the seasonal abundance and spatial distribution of eggs and early larvae of the bay anchovy. Spawning of _Anchoamitchilli_began in May and ended after August, dominating the icthyoplankton. A comparison of larval densities from Chesapeake Bay to those of other east coast estuaries suggests that Chesapeake Bay is a major center of spawning activity for this species. Other icthyoplankton larvae were also collected showing their abundances in relation to the Bay anchovy.

Citation B049

Provenzano, A. J., McConaugha, J. R., Philips, K. B., Johnson, D. F., Clark, J. (1983) Vertical distribution of 1st stage of larvae of the blue-crab _Callinectes sapidus_, at the mouth of the Chesapeake Bay: Estuarine Coastal and Shelf Science, V16, N5, P489-499.

The vertical distribution of the 1st stage in the blue crab larvae was examined over four diurnal cycles. Peak larval abundance occurred after a nighttime high slack tide. 90-99% of all larvae collected were taken in the neuston layer suggesting seaward transport for offshore development.

Citation B050

Johnson, D. F. (1981) The use of recruitment mechanisms by the megalopae of selected brachyuran crustaceans of the lower Chesapeake Bay and inner continental-shelf: Estuaries, V4, N3, P277-

A study of the horizontal and vertical distribution of megalopal stages of selected species of brachyurans was looked at in relation to their evolution from a marine to freshwater habitat. This study examines the hypothesis that the evolution of a species from a marine to a freshwater habitat is accompanied by the development of a larval retention mechanism to insure successful recruitment. A study of the horizontal and vertical distribution of megalopal stages of selected species of brachyurans, in relation to the location of the adult population, was used as a model system.

Citation B051

McConaugha, J. R., Provenzano, A. J. (1980) Distribution and migration of blue crab larvae in the lower Chesapeake Bay USA and adjacent coastal waters: Am Zool 20(40):888.

The vertical distribution of the larval stages in Callinectes sapidus were studied in order to determine the times of peak abundance at various depths. Changes in salinity and temperature were also noted at the two stations in the mouth of the Chesapeake Bay. Samples taken in the summer of 1979 showed that 60-99% of stage I C. sapidus larvae were located in the neuston layer. 40-75% of stage I was taken during the early morning hours. Peak abundance occurred after the night maximum flood tide and corresponded with increasing temperature and decreasing salinity. These peaks may occur at such times to insure offshore transport of stage I C. sapidus larvae.

Citation B052

Morgan, S. G. (1980) Aspects of larval ecology of 'Squilla empusa' (Crustacea,Stomatopoda) in Chesapeake Bay: Report No.: NOAA-81022402-11 and US Nat'l Mar Fish Serv Fish Bull 78(3): 693-700.

The larvae of Squilla empusa were collected from the plankton in order to determine their temperature and salinity tolerances. Collections were taken at the bay mouth where larvae were more abundant.

Citation B053

Dauer, D.M., Ewing, R.M., Tourtellotte, G.H., Baker, H.R. (1980) Nocturnal swimming of Scolecolepides viridis (Polychaeta:spionidae:Estuaries 3(2):148

Adult Scolecolepides viridis were collected by nocturnal plankton tows in the Lafayette River. They are found swimming only on ebb tides at night in February, which is associated with their reproductive period. Their movement is downward toward the mouth of the Chesapeake Bay, establishing populations further down in the estuary. Most larvae were found in higher salinity areas of the bay, tending to occur in the bottom layers the majority of the times in order to be retained within the estuary. The larvae's main movement in the vertical direction was in response to tidal flow rather than to changes in illumination, moving inward to maintain the endemic adult populations.

Citation B053.1

Goy, J. W. (1976) Seasonal distribution and the retention of some decapod crustacean larvae within the Chesapeake Bay: M.S. thesis ODU, Dr. Anthony J. Provenzano, Chairman.

The lower portion and entrance area of the Chesapeake Bay were used as a study site in determining the distribution of each larval stage of the decapod crustaceans. Bottom and surface samples were taken over a three year period.

Citation B054

Sandifer, P. A. (1975) The role of pelagic larvae in recruitment to populations of adult decapod crustaceans in the York River estuary and adjacent lower Chesapeake Bay: Estuar Coast Mar Sci 3: 269-279.

The distribution patterns of some larval decapod crustaceans in the York River and adjacent lower Chesapeake Bay were used to suggest a means by which young stages can be recruited to the adult benthic and bentho-pelagic populations. Two basic mechanisms of recruitment appear to be recruitment by retention of larvae and recruitment by immigration of juveniles and adults. These explain the heavy concentration of larvae in the lower water layer where net transport is upstream.

Citation B055

Sandifer, P. A. (1973) Distribution and abundance of decapod crustacean larvae in the York River estuary and adjacent lower Chesapeake Bay, Virginia, 1968-1969: Ches Sci 14(4): 235-237.

Surface and bottom plankton samples were taken over a two-year period in order to study decapod crustacean larvae. Samples were taken from the Pamunkey River down through to the mouth of the Chesapeake Bay. Decapod larvae were numerous throughout the estuary in the summer with many of the common species being more abundant in bottom collections than near the surface.

Citation B056

Corporate Source: U.S. National Marine Fisheries Service (19??-9999) Chesapeake Fisheries, annual summary: Current fisheries statistics; No. 7702.

No annotation.

Citation B057

Aitkenhead, W. B. (1978) Mercury, Copper and Zinc in selected ichthyofauna of lower Chesapeake Bay and Hampton Roads, VA: M.S. thesis ODU, Dr. Ray S. Birdsong, Chairman.

The collection of anchovys, croaker, spot, summer flounder and hog chokers was conducted monthly to seasonally in order to determine the concentrations of mercury, copper and zinc. The three locations from which collections were made are Craney Island, Buckroe Beach and Magothy Bay. Mercury levels exceeding 0.5 ppm were observed in species from all three locations, but maximum heavy metal concentrations per species were highest in Craney Island fishes. Mercury content was highest in winter and lowest in summer. Metal concentration to size relationships varied with species and location with high concentrations of copper being associated with larger anchovys from Craney Island and spot from Magothy Bay. Mercury decreased with increasing size in anchovys, croaker and spot from Craney Island and anchovys and spot at both Buckroe Beach and Magothy Bay. Also, larger fish tended to accumulate less zinc than smaller fish.

Citation B058

Bellanca, M. A., Bailey, D. S. (1977) Effects of chlorinated effluents on aquatic ecosystem in the lower James River: J Water Pollut Control Fed 49(4): 639-645.

Massive fish kills in the Lower James River during the spring of 1973 resulted im the study of chlorinated wastewater effluents on aquatic life.

Citation B059

Merriner, J. V., Laroche, J. L. (1977) Fecundity of the northern puffer Sphoeroidea-maculatus from Chesapeake Bay USA: Chesapeake Sci 18(1):81-83.

Fecundity data for 24 northern puffer from the lower Chesapeake Bay are determined in relation to total body length and body weight. Total fecundity increased exponentially as a function of fish total length and linearly as a function of fish weight.

Citation B060

Olney, J. E., Grant, G. C. (1976) Early planktonic larvae of the black cheek tonguefish Symphurus plagiusa pisces cynoglossidae in the lower Chesapeake Bay, Virginia USA: Ches Sci 17(4): 229-237.

The early larval stages of S. plagiusa are illustrated and described from the catches taken in the lower Chesapeake Bay during a 3-year zooplankton survey 1971-1974. Their distribution and abundance were studied during the period of hatching. Larvae were taken during July and/or August each year. The majority of the catch consisted of recently hatched larvae which were most abundant in the deepest and most saline portions of the bay.

Citation B061

Wenner, C. A., Musick, J. A. (1975) Food habits and seasonal abundance of the American eel, Anguilla rostrata, from the lower Chesapeake Bay: Ches Sci 16:62-

The food habits and seasonal abundance of the American eel were studied in the lower Chesapeake Bay sub-estuaries. The three areas where the eels were caught were the main channels of the York and James, and also the Rappahannok River. The most important dietary items of A. rostrata include polychaetes, crustaceans and bivalves. They increased in number in the spring and decreased with lower autumn temperatures.

Citation 062

Also see the following citations:
B015,B079,C021,G002,P006

Erkenbrecher, C. W., Jr. (1982) The seasonal distribution of aerobic heterotrophic bacteria in an urban Chesapeake Bay Estuary USA: Va J Sci 33(1): 3-12.

The native bacterial populations in the Hampton Roads area, specifically the Lynnhaven estuary, were studied in order to determine their occurrence and distribution. The aerobic, heterotrophic bacteria are shown to vary with seasonal changes in the ecosystem microflora. Pelagic and benthic densities increased from Lynnhaven's inlet to the eastern and western headwater branches as salinities decreased. Less surface area in the coarser sediment near the inlet is also a factor in decreased bacterial densities. Pelagic bacterial numbers peak in the Lynnhaven during May and September possibly due to the spring and late summer phytoplankton blooms.

Citation B063

Kaper, J. B., Lockman, H., Colwell, R. R., Joseph, S. W. (1981) Aeromonas hydrophila ecology and toxigenicity of isolates from an estuary: J Appl Bacteriol 50(2): 359-378.

A microbiological survey of Aeromonas hydrophila was conducted in the Chesapeake Bay and its tributaries. This species is toxic and may be pathogenic for man and/or animals. A. hydrophila decreased in number as salinities exceeded 15%. . Seasonal fluctuations occurred showing the species to have fewer strains during the winter months.

Citation B064

Erkenbrecher, C. W., Jr. (1980) Sediment bacteria as a water quality indicator in the Lynnhaven estuary Virginia USA: Va Polytech Inst State Univ Water Resour Res Cent Bull 0(126).

A study of Lynnhaven estuary documented the spatial and temporal distribution and composition of bacteria in the sediments and overlying waters. Indicator bacteria were used to determine potential health hazards for commercial and recreational activities.

Citation B065

Also see the following Citations:
B008,B017,B071,C027,C038,C041

Burreson, E. M., Zwerner, D. E. (1982) The role of host biology vector biology and temperature in the distribution of trypanoplasma bullocki infections in the lower Chesapeake Bay USA: J Parasitol 68(2): 306-313.

The hemoflagellate T. bullocki and its leech intermediate host, Callioobdella vivida, were studied concurrently over an 18 month period. Several fish were found to be infected with these parasites. C. vivida was most abundant near the mouths of the major rivers where salinity ranged between 15 and 22 ppt. Infection of T. bullocki in migratory fishes were rare and were resricted to periods of leech contact during early spring or late fall. Infection is correlated with the leeches depositing their coccoons in late April and early May, and the hatching of the coccoons in late September. Most leeches are absent during the summer months.

Citation B066

Kirk, P. W., Jr., Brandt, J. M. (1980) Seasonal distribution of lignicolous marine fungi in the lower Chesapeake Bay: Bot Mar 23(10): 675-688/

Substrate preferences and successional behavior were described for higher marine fungi and other taxa collected on wood in the lower Cheapeake Bay area.

Citation B067

Colwell, R. R., McNicol, L. A., Orndorff, S. A., Kelley, J. (1981) Microbial degradation of Kepone in the Chesapeake Bay: Technical Report 64.

The purpose of this study was to identify the effects of Kepone on the microflora of both the water and sediment and their metabolic processes. Also of interest were the intermediate metabolites and end products of possible microbial Kepone degradation.

Citation B068

Roberts, M. H., Jr. (1981) Kepone distribution in selected tissues of blue crabs, Callinectes sapidus, collected from the James River and lower Chesapeake Bay: Estuaries 4(4): 313-320.

Male and female blue crabs were collected from seven stations in the lower Chesapeake Bay and lower James River. Kepone concentrations were determined showing little kepone contamination in crabs of the lower Bay, while many crabs from the lower James River were contaminated.

Citation B069

Roberts, M. H., Jr., Leggett, A. T., Jr. (1980) Egg extrusion as a Kepone clearance route in the blue crab Callinectes sapidus: Estuaries 3(3): 192-199.

Collections of extruded egg masses were taken from 7 stations in the lower James River and lower Cheapeake Bay in order to determine the concentration of Kepone. These concentrations were compared with those in the back fin muscles of the blue crab. It was found that egg extrusion is a major route of Kepone clearance from female blue crabs.

Citation B070

Colwell, R. R., Orndorff, S. A. (1980) Distribution and characterization of Kepone-resistant bacteria in the aquatic community: Applied and Environmental Microbiology 39(3): 611-622.

Kepone-resistant bacteria were studied from the Chesapeake Bay and James River. Kepone-resistance in bacteria is due to the physicochemical composition of the gram-negative cell wall and not prior exposure to Kepone. These bacteria, therefore cannot be used as indicators of Kepone contamination in the aquatic environment, butthey do reflect the degree of fecal and high organic pollution of the sampling sites.

Citation B071

Larsen, R. R. (1979) The distributrion of heavy metals in the hard clam, _Mercenaria mercenaria_, in the lower Chesapeake Bay region: Estuaries 2(1): 1-8.

Populations of the hard clam, _M. mercenaria_, were sampled at 30 sites in the Lower Chesapeake Bay region in 1972 and 1973 with emphasis placed on samples from the York and James Rivers. _M. mercenaria_ was analyzed for Cd, Cu, and Zn. Differences in levels between the York and James rivers were statistically significant ($P<0.001$) which indicates that the James River probably suffers from contamination by these metals. Cu varies with the age of the organism, whereas Cd and Zn vary with salinity.

Citation B072

Provenzano, A. J., Jr., Schmitz, K. B., Boston, M. A. (1978) Survival, duration of larval stages, and size of post larvae of grass shrimp, _Palaemonetes pugio_ reared from Kepone contaminated and uncontaminated populations in Chesapeake Bay: Estuaries 1(4): 239-244.

Larvae from female grass shrimp in the Chesapeake Bay were reared in the laboratory. Newly hatched larvae from each site were analyzed for Kepone, showing high concentrations in larvae from the James River and the second highest concentrations in larvae from the Lafayette River.

Citation B073

Hershner, C., Moore, K. (1977) Effects of the Chesapeake Bay oil spill on salt marshes of the lower bay: American Petroleum Institute. Publication 4284, p. 529-533.

The effects of the Chesapeake Bay oil spill of February 1976 on the eastern shore of the bay was studied in order to assess the biological impact on the marshes at the population level.

Citation B074

Also see the following citations:
C011,P006

Norfolk District Army Corps of Engineers, Virginia Council on the Environment (1983) Virginia Port Authority's Coal Terminal at Portsmouth, Virginia: Environmental Impact Statement.

The environmental consequences of the proposed coal terminal in Portsmouth, Virginia on the Elizabeth River are explained in relation to the impact it would have on the aquatic ecology of that area.

Citation B075

Provenzano, A. J., Feigenbaum, D. L., Blair, C., Johnson, D. E., Kelly, M. (1982) Jellyfish exclusion project-Ocean View, Norfolk, VA 1982: Technical Report No. 82-7.

The abundance of jellyfish, sea nettles in particular, during the summer months in the Chesapeake Bay, caused the construction of net barriers at Community Beach and Sarah Constant Beach in Ocean View. The results showed that the project was successful in restricting the large numbers of jellyfish from inside the swimming area. Further use of such barriers is highly favored by the public users of the beaches.

Citation B076

Environmental Protection Agency, Washington, D.C. Office of Research and Development. (1982) Chesapeake Bay: introduction to an ecosystem: Report No. EPA-600/9-82-016.

The ecological processes in the Chesapeake Bay are explained in this document. It introduces several forthcoming Bay program publications which will describe the results of scientific investigations and identify management solutions to specific resource problems.

Citation B077

Shea, G. B., MacKiernan, G. B., Athanas, L. C., Blell, D. F. (1980) Chesapeake Bay low freshwater inflow study: Western Eco-Systems Technology, Inc., Bothell, WA Corp Source Codes: 077486000; 413423.

The effects of low freshwater inflow conditions on the biota of Chesapeake Bay was assessed by the use of data output from the U. S. Army Corps of Engineers Chesapeake Bay Hydraulic Model.

Citation B078

Birdsong, R. S., Dauer, D. M., Johnson, R. E., Levy, G. F., Merritt, J. F., Marshall, H. G. (1979) An environmental impact study in Cape Charles, Virginia in relation to the proposed Brown and Root, Inc. Marine Fabrication Facility: Final Report prepared for Brown and Root, Inc. Contract Nos. 2-0-3568 and 2-0-3749.

Several studies were done in the Cape Charles area in order to assess the environmental impact of the proposed Brown and Root, Inc. Marine Fabrication Facility. Subjects of concern were macrobenthic invertebrates, the fin fishes and fin fishery, the blue crab fishery, the sea grass beds, and the ecology and distributional patterns of the vertebrate fauna.

Citation B079

Crewe, B. J., Laird, B. L. (1976 ed.) Research on Chesapeake Bay and contiguous waters of the Chesapeake bight of the Virginia Sea: Virginia Institute of Marine Science - Office of Special Programs.

This publication contains a listing of projects which were being researched as of 1976. There are several biological papers listed which should be annotated under their proper categories in the literature search.

Citation B080

Marshall, H. G. (1974) A report on environmental status of the Craney Island Disposal Area and three alternative replacement locations being considered as future disposal sites: Submitted to the U. S. Army Corps of Engineers - Contract No. DACW-0064.

The ecological conditions of the Craney Island Disposal Site were assessed along with three possible areas for future locations. These areas, which were chosen by the Corps of Engineers for further study, include the westward extension of Craney Island, the horseshoe section off Buckroe Beach, and the Nansemond County Site. The major concerns of this study were to survey the natural biota in their local environment and indicate the ecological impact of a disposal site on these areas.

Citation B081

There are several general references for the bay species which are not of specific interest to the study site but should prove valuable in identifying the taxa which may be found in the area. They are listed here for future reference.

Orth, R. J. (1981) Submerged aquatic vegetation of the Chesapeake Bay USA past, present and future: Transactions of the 46th North American Wildlife and Natural Resources Conference, Resource management for the 80's, Washington, D. C. March 21-25, 1981.

No annotation.

Citation B082

Stevenson, J. C. (1978) Summary of available information on Chesapeake Bay submerged vegetation: Dept. of the Interior, Fish and Wildlife Service, Contract No. FWS 14-16-0008-2138.

No annotation.

Citation B083

Boesch, D. F. (1977) A new look at the zonation of benthos along the estuarine gradient: Ecology of Marine Benthos. Symposium, Georgetown, S. C., USA, May 7-10, 1975.

No annotation.

Citation B084

Sandifer, P. (1972) Marine decapod crustacean larvae of the Chesapeake Bay, with provisional keys to their identification. Ph.D. dissertation VIMS.

No annotation.

Citation B085

Wass, M. L. (1972) A checklist of the biota of lower Chesapeake Bay with inclusions from the Upper Bay and the Virginia Sea: Special Scientific Repoort No. 65, VIMS.

No annotation.

Citation B086

Mcerlean, A. J. (1972) Biota of the Chesapeake Bay: Introduction: Chesapeake Science, 13 (Supplement) 54-57.

No annotation.

Citation B087

Kerby, C. (1972) Biota of the Chesapeake Bay: Chesapeake Science, 13 (Supplement): S1-S197.

No annotation.

Citation B088

CHEMICAL ANNOTATIONS

by
E. A. Stern

This is an annotated bibliography of the chemical oceanographic research done for the last ten years (1973 - 1983) in the lower Chesapeake Bay (latitude and longitude coordinates 36 50′N, 37 10′N, 75 50′W, 75 20′W).

This section of the bibliography is divided into subcategories and then arranged by year from oldest to the most recent publication in alphabetical order by senior authors last name. The chemical oceanography of the lower Chesapeake Bay was sectioned in six catagories.

1. NUTRIENTS: includes subject material on nitrogen, nutrient enrichments, phosphates, phosphorous, nitrates and ammonia.

2. ORGANICS: includes subject material on hydrocarbons, kepones, organic compounds and sewage outfalls.

3. TRACE ELEMENTS:

4. WATER QUALITY: includes subject material on ammonia nitrogen, BOD, benthal OD., carbonaceous dissolved oxygen, chlorophyll "a", dissolved oxygen, inorganic-orthophosphate, light intensification, nitrite-nitrate, organic nitrogen, phosphorous, suspended sediments, turbidity, temperature, total Kheldahl nitrogen (TKN), total residual chlorine.

5. SYNTHESIS REPORTS: Includes technical reports by the EPA that are multidisciplinary in nature.

6. HEAVY METALS:

Articles were obtained from the libraries at Old Dominion University and the Virginia Institute of Marine Science. Computer searches were conducted using the following databases from the DIALOG Retrieval Services:

A. CHEMICAL ABSTRACTS- (American Chemical Society) 1972-1983. Key Words: " S. Chesapeake Bay ", " Chesapeake Bay "

B. GEOREF- (American Geological Institute) 1961-1983/Oct. Searches by latitude/longitude coordinates. LT=366500:LT=393700:LN=0754000:LN763300

C. POLLUTION ABSTRACTS-(Cambridge Scientific Abstracts) 1970-1983/Oct. Key Words: " S. Chesapeake Bay ", " Chesapeake Bay "

D. WATER RESOURCES ABSTRACTS- 1968-1983. Key Words: " lower Chesapeake Bay " " S. Chesapeake Bay ", " Chesapeake Bay", " water quality "

Manual searches of the chemical oceanography of the lower Chesapeake Bay included:

a. MS. and Ph.D thesis/Biological, Chemical, Oceanographic- ODU, VIMS

b. ODU Technical Reports

c. VIMS SRAMSOE, SSR Reports

d. Bibliography of the Chesapeake Bay, VIMS.

The majority of the studies in this portion of the annotated bibliography dealt with water quality and modelling parameters of the lower Chesapeake Bay. VIMS, HRSD, and ODU technical reports comprised the largest data base on site specific locations requested in this study. These reports included extensive data sets on the physical and chemical characteristics related to water quality including numerical models. Most of these reports, however, were highly localized within the Elizabeth and James Rivers, and Hampton Roads areas. The synthesis reports included generalized summeries of chemical parameters for the entire Chesapeake Bay. These reports were divided into specific locations encompassing the lower Bay, and their respective chemical characteristics. In conclusion, utilizing manual and computer services there has been few studies of the Lower Chesapeake Bay as compared to the entire estuary.

McCarthy, J. J.; Taylor, W. R.; Taft, J. L. (1975) Dynamics of nitrogen and phosphorus cycling in the open waters of the Chesapeake Bay: Mar. Chem. Coastal Environ., V. 18, pp. 664-81.

No annotation.

Citation C001

Taft, J. L.; Taylor, W. R. (1976) Phosphorus distribution in the Chesapeake Bay: Chesapeake Sci. V. 17, No. 2, pp. 67-73.

Describes phosphorus distribution from stations in the open waters of the Chesapeake Bay including the bay mouth.

Citation C002

Smith, C. L. (1977) Effects of Tropical Storm Agnes on nutrient flux and distribution in lower Chesapeake Bay: in The Effects of Tropical Storm Agnes on the Chesapeake Bay Estuarine system. CRC Inc. Pub. No. 54, pp. 299-310.

Nutrient concentrations were measured in the summer of 1972 immediately following flooding associated with Tropical Storm Agnes. Total phosphate, total Kheldahl nitrate, dissolved orthophosphate, dissolved nitrite, dissolved nitrogen and total nitrogen were measured. Includes data tables and distribution plots.

Citation C003

Webb, E. L.; Hayward, D. M.; Baker, J. M.; Murry, B. (1979) Est uarine response to nutrient enrichment, a counterpart of Eutrophication-A Bibliography: CRC Inc. Pub. No. 68, SSR. No. 95, VIMS 269p.

Compiled literature search related to nutrient enrichment of estuaries by use of DIALOG Information retrieval services. Includes key word cross index and 543 citations.

Citation C004

Heinle, D. R. (1980) Historical review of water quality and climatic data from Chesapeake Bay with emphasis on effects of enrichment: CRC Inc. Pub. No. 84.

No annotation.

Citation C005

Neilson, B. J. (1981) The consequences of nutrient enrichment in estuaries. U.S. EPA Chesapeake Bay Program Final Report: CRC Inc. Pub. No. 96.

No annotation.

Citation C006

Wong, G.T.F.; Todd, J. F. (1981) Nutrients in waters on the inner shelf between Cape Charles and Cape Hatteras: in Chesapeake Bay Plume Study, Superflux, NASA Conf. Pub. 2188, pp. 261-281.

Distribution of nutrients from the Chesapeake Bay and adjacent shelf waters. Parameters include phosphate, nitrate, ammonia, silicates and salinity. Includes profiles and data tables.

Citation C007

Also see the following:
C028,C029,C035,C038

MacIntyre, W. G.; Smith, C.L.; Munday, J. C.; Gibson, V. M.; Lake, J. L. (1974) Investigation of surface films -Chesapeake Bay entrance: EPA-670/2-73-099; Report No. W74-08831, 179p.

Experimental point source oil releases have been conducted in the Chesapeake Bay mouth area. Prediction of oil slick motion was tested and slicks were sampled and analyzed to measure their aging rates over periods up to 32 hours. Indigenous surface films in the study area were analyzed for lipid and chlorinated hydrocarbon content. Remote sensing techniques were used to detect and measure the spreading rate of oil.

Citation C008

Haluska, J. D. (1975) The analysis of volatile organic compounds in the southern Chesapeake Bay, Virginia by gas chromatograph and mass spectrometry. Inst. of Oceanog. Old Dominion Univ., M.S. thesis.

Sea water samples were analyzed for trace volatile organic compounds by helium sparging in the study area of lower *Chesapeake* Bay. Site location includes Cape Charles, Cape Henry and the Elizabeth River. The halogenated compounds identified were dichlorofluoromethane, trichlorotrifluroethane, carbontetrachloride, chloroform, trichloroethane (2 isomers), bromodichloromethane, and chlorotrifluoroethylene. All eight compounds were detected in the Elizabeth River, while six were detected in the Chesapeke Bay waters at generally lower relative concentrations.

Citation C009

Huggett, R. J. (1977) Kepone in the southern Chesapeake Bay: American Chemical Society: 11th Middle-Atlantic Regional Meeting. Washington, D. C.

No Annotation

Citation C010

Huggett, R. J.; Bender, M. E. (1980) Kepone in the James River: Environ. Sci. and Technol. V. 14, No. 8 pp. 918-923.

This article detailed numerous studies on the potential effects of kepone on the James River biota. The major source of kepone contaminants in Virginia is the Allied Chemical Plant in Hopewell, Virginia which began producing kepone in 1966. In the Chesapeake Bay moving north from the James River, kepone residues in most species exhibit a significant decline. The authors determined whether kepone could be purged from contaminated animal.

Citation C011

Brown, R. C. (1983) Input and distribution of sewage derived sedimentary material adjacent to Chesapeake-Elizabeth sewage outfall, Virginia Beach, VA. Inst. of Oceanog. Old Dominion Univ., M.S. thesis.

Concentrations of coprostonal and hydrocarbons were measured in the effluent from the Chesapeake-Elizabeth Sewage Treatment Plant. Surface sediments from the area surrounding the effluent discharge site were also analyzed. Amount of material < 63 microns was also measured.

Citation C012

Brown, R. C.; Wade, T. L. (1981) Coprostonal as a potential tracer of particulate sewage effluent to shelf waters adjacent to the Chesapeake Bay: in Chesapeake Bay Plume Study, Superflux 1980, NASA Conf. Pub. 2188, pp. 243-50.

Samples were collected in the Chesapeke Bay entrance and shelf waters and analyzed for particulate coprostonal and cholesterol concentrations. Findings indicate sewage associated materials are being transported from the Chesapeake Bay to shelf waters where they may have a detrimental effect on living marine resources. Includes data tables.

Citation C013

Oertel, G. F.; Wade, T. L. (1981) Characteristics of total suspended matter and associated hydrocarbon concentrations adjacent to the Chesapeake Bay entrance: In Chesapeake Bay Plume Study, Superflux 1980, NASA Conf. Pub. 2188, pp. 251-60.

The purpose of this study was to determine the concentrations of hydrocarbons and associated suspended particulates at stations in and adjacent to the entrance to the Chesapeake Bay. Data includes total suspended matter, salinity and hydrocarbon concentration profiles.

Citation C014

Wade, T. L., Oertel, G. F. (1981) Concentration of hydrocarbons associated with particles in the shelf waters adjacent to the entrance of Chesapeake Bay: in Chesapeake Bay Plume Study, Superflulx 1980, NASA Conf. Pub. 2188, pp. 237-242.

Particulate hydrocarbons were measured in 94 water samples from the 1980 Superflux II and Baplex cruises. Concentrations ranged from below the detection limit (<0.7 ug/l to 32 ug/l). The mean for all samples were 5.6 ug/l. Particulate hydrocarbon concentrations are higher in the Bay mouth and lower in the shelf water adjacent to the entrance of Chesapeake Bay.

Citation C015

Bleri, R. H.; DeFur, P.; Huggett, R. J.; MacIntyre, W.; Shou, P. (1983) Organic compounds in surface sediments and oyster tissues from the Chesapeake Bay: EPA-600/3-83-018A; Order No. PB83-187443, 107p.

Detailed in the first part of this report is the development and discussion of the methodologies used to extract and analyze sediment and oyster tissue samples from Chesapeake Bay for hydrocarbon compounds. An extensive list of mass spectral data and related information is contained in the appendices. Polynuclear aromatic compounds are present in higher concentrations then of all organic pollutants in the bay. The application of 2 different search routines, one concentrating on compounds at levels greater than 50 ppb and the other on temporal change, allows a quick determination of where problem areas may exist and where additional investigation may be indicated.

Citation C016

Farrington, J. W.; Goldberg, E. D.; Risebrough, R. W.; Martin, J. H.; Bowen, V. T. (1983) U.S. "Mussel Watch" 1976-1978: An overview of the trace metal, DDE, PCB, hydrocarbon, and artificial radionuclide data: Environ. Sci. Technol., Vol. 17, pp. 490-496.

This report presents data for trace metals, polychlorinated biphenyls, (PCBs), aromatic hydrocarbons and 239,240 Pu in *Mytilus edulis*, *M. californianus*, and *Crassoatrea* sp. collected in the U.S. Mussel Watch program in 1976-1978 from 62 locations on the U.S east and west coasts. Regional data includes sites from Cape Charles and Lynnhaven Bay. Includes chemical concentraions and temporal fluctuations graphs.

Citation C017

Brown, R. C.; Wade, T. L. (1983) Sedimentary coprastanol and hydrocarbon distribution to a sewage outfall: Water Research (in press)

Concentrations of coprastanol and hydrocarbons were measured in the effluent from the Chesapeake-Elizabeth Sewage Treatment Plant (STP) and surface sediments from the area surrounding the effluent discharge site. This study shows the usefullness of coprastanol in providing a better understanding of the fate and importance of sewage derived contaminants in areas surrounding sewage outfall. Report includes gas chromatographs of sterols and hydrocarbons in STP effluents and sediments, silt and clay percentage distributions in sediments and coprastanol and hydrocarbon distribution in sediments.

Citation C018

Wade, T.L.; Oertel, G. F.; Brown, R.C. (1983) Particulate hydrocarbon and coprastanol concentrations in shelf waters adjacent to Chesapeake Bay: Can. J. Fish. Aquat. Sci. 40 (Suppl. 2) pp.34-40.

This paper states that at the inner shelf adjacent to the Chesapeake Bay entrance, patchiness of coprastanol, hydrocarbons and total suspended matter concentrations are controlled by alongshore wind stress which enhances the uncoupling of the distal ends of plumes. While Chesapeake Bay appears to be a chronic source of anthropogenic materials to adjacent shelf waters, major pathways of several pollutants (sewage derived and hydrocarbons) do not spatially coincide with turbid or low salinity plumes. Includes data from Cape Charles to Cape Henry transects. Figures of surface salinity distributions, surface coprastinol concentrations, particulate hydrocarbon concentrations, and total suspended matter concentrations.

Citation C019

Also see the following:
B019,B069,B070,B071,B073,B074
C058

ANON. (1974) A report on the concentration, distribution, and impact of certain trace metals from sewage treatment plants on the Chesapeake Bay: CRC Inc. Pub. No. 31.

No annotation.

Citation C020

Roberts, M. H. (1980) Survival of juvenile spot Leiostomus xanthurus exposed to bromochlorinated and chlorinated sewage in estuarine waters: Mar. Environ. Res. Vol. 3(1): pp. 63-80.

No annotation.

Citation C021

Sinex, S. A.; Contillo, A. Y.; Helz, G. R. (1981) Trace elements in the sediments of Baltimore Harbor and Elizabeth River: EPA/R-805954, Univ. of MD, Towson, MD, 38p.

No annotation.

Citation C022

Sinex, S. A.; Helz, G. R. (1981) Regional geochemistry of trace elements in Chesapeake Bay sediments (USA): Environ. Geol. (N.Y.) Vol. 3, No. 6, pp. 315-323.

No annotation.

Citation C023

Sinex, S. A. (1982) Trace element geochemistry of modern sediments from Chesapeake Bay: Sci. and Eng. Vol. 42, no. 8.

Two hundred surface grab samples of sediment were collected on twenty-five traverses which span the Chesapeake Bay from the Susquehanna River to its mouth. Knowledge of the surficial distribution and net depositional fluxes of trace elements in the bay will allow evalulation of sources and mechanisms of transport. Method calibration and quality assurance tests were performed by analyses of the NBS river sediment standard.

Citation C024

Kingston, H. M.; Greenberg, R. R.; Beary, E. S.; Hardas, B. R.; Moody, J. R. (1982) The characterization of the Chesapeake Bay: a systematic analysis of toxic trace elements: Technical report EPA-600/3-82-085; Order No. 1 PB82-265265, 210p.

No annotation.

Citation C025

Zaneveld, J. S. (1973) Physical and chemical aspects of the bay: in The Chesapeake Bay as an Estuary: Old Dominion Univ. Inst. of Oceanog.

Water quality survey of the lower Chesapeake Bay, bay entrance and Hampton Roads. Seasonal studies of dissolved oxygen, temperature, salinity, density, turbidity, and nutrients. Includes data tables, graphs and study site area.

Citation C026

Adams, D. D.; Wisenberg, D. A.; Sauer, T. C. (1974) Investigation and monitoring of Hampton Roads Sanitation District sewage outfalls and the receiving waters, Norfolk, Virginia - Preliminary observation from June to November 1973: Instit. of Oceanog., Old Dominion University, Tech. Report No. 15.

Summary report of initial observations during the months of June to Nov. 1973 of water quality in the lower Chesapeake Bay, Hampton Roads and James River. Program emphasized monthly sampling of 7 sewage outfalls of the HRSD. Parameters investigated were temperature, salinity, pH, DO, inorganic orthophosphate-phosphorous, nitrate, nitrite, BOD5, fecal coliform bacteria, total residual chlorine, Cu, Pb, Zn. Analysis suggested that sewage plume dispersion could be better understood by concentrating on the monitoring of surface water rather than sampling deeper in the water column. Report includes numerical models, computer programs, graph, data plots.

Citation C027

Adams, D. D.; Young, R. J. (1975) Water quality monitoring of the Craney Island dredge material disposal area, Port of Hampton Roads, Virginia; December 1973 to February 1975: Old Dominion Univ., Inst. of Oceanog. Tech. Report No. 23.

Effluent from three spillways at the Norfolk District of the U.S. Army Corp. of Engineers Craney Island dredged disposal area in the Port of Hampton Roads was monitored from December 1973 to February 1975. During the first nine months of the program, dredged material entering Craney Island was collected to assess its composition. Eighteen different chemical parameterss were tested: temperature, salinity, pH, dissolved oxygen, dissolved inorganic orthophosphate, total phosphorous, nitrate, nitrite, ammonia, total nitrogen (TKN), fecal coliform, total suspended solids, dissolved and particulate Cd, Hg, and Zn. Concentrations of each chemical parameter at the spillway was compared to its value at the background site, and there in turn were related to the composition of contiguous waters. Includes statistic tables, figures and reccommendations.

Citation C028

ANON. (1975) Water Quality of the Chesapeake Bay. History and Projections: in Second Interim Report to National Commission on Water Quality, VIMS.

Extension work on the water quality and history of dissolved oxygen and nutrients of Chesapeake and lower Chesapeake Bay. Includes water quality models with description, calibration and verification of models. Point and non-point sources of pollution with results of total phosphorous, total nitrogen and dissolved oxygen. Tables and data plots.

Citation C029

Neilson, B. J. (1975) A water quality study of the Elizabeth River-the effects of the Army base and Lambert point STP effluents: VIMS SRAMSOE 75.

No annotation.

Citation C030

Neilson, B. J.; Fang, C. S. (1975) A hydrographical and water quality study during the construction of second Hampton Roads bridge tunnel: A report to Virginia Dept. of Highways; VIMS.

This study comprises the results of water quality monitoring during dredging activities for the second Hampton Roads bridge tunnel. Measurements of dissolved oxygen and slack water were made in 1971 and 1974 during dredging operations. Assumptions were made that changes due to construction were smaller than those which occur naturally. From the point of view of D.O. water quality standards, there appears to be no problems resulting from such dredging activities.

Citation C031

ANON. (1976) Water Quality Inventory (305 (b) Report) Virginia, Report to EPA Administrator and Congress Informatin Bulletin 526, pp. 281-312.

Water Quality survey of the small coastal basins of Chesapeke Bay including portions of the cities of Norfolk, Virginia Beach, Hampton and Newport News. Includes industrial and municipal discharge lists, tables, and plots.

Citation C032

Fleischer, P., (1976) Correlation of chlorophyll, suspended matter, and related parameters of waters in the lower Chesapeake Bay Area to Landstat-1 imagery: Old Dominion Univ., Inst. Oceanog. Tech. Report No. 28.

This report is a study of lower Chesapeake Bay and estuarine waters correlated to Landstat-1 multispectral imagery. Water quality parameters sampled include chlorophyll, particle count analysis, turbidity, bathymetry, suspended sediments, salinity, and temperature. This data was measured over a period of 1 year by helicopter and satellite-ship synchronous overpassess.

Citation C033

Neilson, B. J. (1976) A Report to the Hampton Roads Water Quality Agency, in Applied Marine Science and Ocean Engineering, Special Report No. 129. VIMS

No annotation.

Citation C034

Neilson, B. J. (1976) Water quality in the small coastal basins: A report to the Hampton Roads Water Quality Agency, VIMS Special Report No. 129.

The small coastal basins studied are part of the Hampton Roads 208 Study area which include Back and Poquoson Rivers, Little Creek Harbor, and the Lynnhaven Bay system. All 4 river basins were sampled for temperature, salinity, dissolved oxygen, nutrients, coliforms and chlorophyll "a". Includes computer generated plots and study areas.

Citation C035

Witte, J. G. (1976) Evaluation of water samples collected during Landsat-1 overpasses of the lower Chesapeake Bay Area: NASA Langley Res. Cen. Int.
Conf. on Environ. Sensing and Assesssment: Vol. 1, New York, 5p.

No annotation.

Citation C036

Adams, D. D.; Walsh, D. T.; Grosch, C. E.; Kuo, C. Y. (1977) Investigative monitoring of sewage outfalls and contiguous waters of Hampton Roads, Elizabeth and James River, and the lower Chesapeake Bay, Virginia, from June 1973 to May 1975: Old Dominion Univ., Inst. Oceanog. Tech. Report. 22, 219 p., Appendix A/B.

Appendix A: This report comprises data from sampling sites at the Portsmouth treatment plant and Hampton Roads. Twenty-four water quality chemical parameters were looked at and a simple statistics program was executed for a combination of these variables. Includes computer program and data.

Appendix B: This study contains computer generated plots of chemical variables measured at 8 sewage outfalls including background stations. Brief statistical summary of each variable is provided before each computer plot.

Citation C037

Cerco, C. F.; Kuo, A. Y. (1977) A water quality model of the Elizabeth River: VIMS SRAMSOE 149.

Details the formulation and application of mathematical ecosystem models to the Elizabeth River system. Water quality measurements include dissolved oxygen, carbonaceous DO, organic nitrogen, ammonia nitrogen, nitrite-nitrate, nitrogen, organic-inorganic phosphorous, chlorophyll "a", coliform bacteria, salinity, temperature, turbidity, and light intensity. These models are calibrated to predict the effect of proposed 1983, 1995 waste loads and to allocate the loads so that water quality standards will be preserved. Includes tables, graphs.

Citation C038

Kuo, A. Y.; Ruzecki, E. P.; Fang, C. S. (1977) The effects of the Agnes floods in the salinity structure of the lower Chesapeake Bay and contiguous waters: in The Effects of Tropical Storm Agnes on the Chesapeake Bay Estuarine System. CRC Inc. Pub. No. 54, pp. 81-103.

Eleven stations were sampled along the lower Chesapeake Bay axis from the Virginia capes to the mouth of the Potomac River. The study entailed transient response of salinity distribution to flood waters from Tropical Storm Agnes. Longitudinal and vertical distribution of salinity, variations of surface and bottom salinities, surface salinities of lower Chesapeake Bay were covered in this report.

Citation C039

Neilson, B. J. (1977) Elizabeth River water quality report: VIMS SRAMSOE 134.

This report deals with the water quality conditions in the Elizabeth River which comprises large volumes of wastewater discharged daily. Surveys were conducted from July 7-9, 1976. Chemical parameters sampled were temperature, salinity, dissolved oxygen, BOD5, fecal coliforms, nitrogen, total phosphorous, chlorophyll "a", UOD, benthal OD, and light/dark bottle.

Citation C040

Neilson, B. J. (1977) Summary of the Hampton Roads 208 Water Quality Modelling Studies: VIMS SRAMSOE 170.

This report assesses present and future water quality conditions including development of a wastewater management plan. Ten variables were measured during the summers of 1975-1976 for dissolved oxygen, nutrient cycling and enrichment, fecal coliforms, bacterial quality, volumetric flow rates and pollutant discharge rates. Water quality models were used to project condition in 1977, 1983, and 1995. Contains graphs and tables.

Citation C041

Neilson, B. J.; Ferry, R. S. (1977) A water quality study of the estuarine James River: VIMS SRAMSOE 131.

Study area encompasses lower James River, Hampton Roads, Elizabeth River mouth, and Cape Charles, Cape Henry transects. Twenty-six stations were sampled in July 1976 for temperature, salinity, dissolved oxygen, BOD5, fecal coliforms, nitrogen, total phosphate, chlorophyll "a", secchi disk, UOD, benthal OD, and light/dark bottle. Includes profiles of salinity, temperature, chlorophyll, nitrogen and phosphorous.

Citation C042

Schubel, J. R.; Cronin, W. B. (1977) Effects of Agnes on the distribution of dissolved oxygen along the main axis of the bay: in The Effects of Tropical Storm Agnes on the Chesapeake Bay Estuarine System. CRC Inc. Pub. No. 54, pp. 335-347.

Dissolved oxygen was sampled along the bay axis at two to four week intervals from 20 July 1972 through 29 June 1973. Its purpose was to chronicle the impact of Agnes on the distribution of dissolved oxygen. Includes dissolved oxygen plots.

Citation C043

ANON. (1978) Hampton Roads Water Quality Agency Management Plan. Hampton Roads Water Quality Agency, Virginia Beach, VA.

No annotation.

Citation C044

Chen, H. S. (1978) Hydrodynamic and biogeochemical water quality models of Hampton Roads: VIMS SRAMSOE 147.

Application of two-dimensional hydrodynamic and biogeochemical water quality models of the lower James River. Twenty-nine stations were sampled during July 15-21, 1976. Water quality variables include temperature, conductivity, dissolved oxygen, BOD5, total Kheldahl nitrogen, (TKN), chlorophyll "a", fecal coliforms, total phosphorous, soluble reactive phosphorous, ammonia-nitrogen, nitrite-nitrogen, nitrate-nitrogen. Includes computer generated modelling plots and data tables.

Citation C045

Neilson, B. J. (1978) Final report on water quality studies of the Hampton Roads area: VIMS SRAMSOE 171.

This study includes water quality conditions in 1975-1976 of the Elizabeth River, lower tidal James River, Little Creek Harbor and Hampton Roads. Chemical parameters were limited to dissolved oxygen levels, fecal contaminants and nutrient enrichments. Concluded (1) dissolved oxygen levels were good in most areas, low dissolved oxygen were found near mouth of Hampton Roads at depths greater than 10 m; (2) nutrient levels were high; (3) fecal coliform levels in Elizabeth and Pagan River were high enough to make the water unsuitable for recreational purposes.

Citation C046

Lang, D. J.; Grason, D. (1980) Water quality monitoring of three major tributaries to the Chesapeake Bay - interim data report: Technical Report USGS/WRD/WRI-80/059, USGS/WRI-80-78, Order No. PB81-113888 78p.

No annotation.

Citation C047

DeMoss, T. B.; Flemer, D. A.; ,Strobel, C. J.; Wilding, D. (1981) Trends in water quality for Chesapeake Bay relative to improved management: Trans. North Am. Wildl. Nat. Resour. Conf. Vol. 46, pp. 233-249.

No annotation.

Citation C048

ANON. (1981) Hampton Roads Sanitation District Chesapeake Elizabeth Sewage Treatment Plant (STP) Monthly Operations Report.

No annotation.

Citatoin C049

ANON. (1981) Hampton Roads Sanitation District. Waste Water Characterization Study: HRSD Water Quality Department, Virginia Beach, VA.

No annotation.

Citation C050

Lang, D. J. (1982) Water quality of the three major tributaries to the Chesapeake Bay, the Susquehanna, Potomac, and James Rivers, January 1979-April 1981: Technical Report, USGS/WRD/WRI-82/048, USGS/WRI-82/32; Order No. PB82-238593 74p.

No annotation.

Citation C051

Brooks, T. J.; Fang, C. S. (1983) James River slack water data report; temperature, salinity, dissolved oxygen 1971-1980: VIMS Data Report No. 12.

This report comprises ten years of contoured temperature, salinity and dissolved oxygen data. Includes material on station locations, survey schedules, field procedures, sample handling, data reduction and storage needs. Report contains computer generated plots.

Citation C052

Also see the following:
B018,B021,B059,B065,B075
C020,C021,C056

ANON. (1982) The Characterization of Chesapeake Bay - Systematic Analysis. Environmental Protection Agency.

This report describes the National Bureau of Standards (NBS) efforts in a multidisciplinary study of the Chesapeake Bay. NBS determined the trace and toxic element concentrations in the water column. Toxic and trace elements were collected and analyzed for dissolved and suspended fractions of 102 water samples covering the entire length of the Chesapeake Bay. Elements of interest include: Cd, Ce, Co, Cr, Cu, Fe, Mn, Mo, Ni, Pb, Sc, Sn, Th, and Zn.

Citation C053

ANON. (1982) Chesapeake Bay Program Technical Studies: A Synthesis - Environmental Protection Agency.

A summary of a 5 year study plan to identify water quality problems in Chesapeake Bay. Included in this synthesis report are accumulation of toxic substances, inorganic, organic compounds, As, Cd, Cr, Cu, Zn, dredging and dredged material, disposal, and nutrient enrichments.

Citation 054

Bieri, O.; Bricker, R.; Byrne, R.; Diza, R.; Helz, J.; Hill, R.; Huggett, R.; Kerhin, M.; Nicholl, E.; Reinharz, L.; Schaffner, D.; Wilding, D.; Strobel, C. (1982) Part 3, Toxic Substances: in Chesapeake Bay Program Technical Studies-A Synthesis: Environmental Protection Agency.

This is a synthesis report that summarizes and integrates the research findings and recommendations of 13 projects of the Chesapeake Bay Toxic Substances Program surveyed between July 1978 and October 1981. Describes research on potentially toxic substances of toxicants in water, sediments and selected biota.

Citation C055

D'Elia, C. F.; Taft, J.; Smullen, J. T.; MacKnis, J. (1982) Part 2, Nutrient enrichment: in Chesapeake Bay Program Technical Studies- A Synthesis: Environmental Protection Agency, pp. 36-262.

This section presents the findings of the Nutrients Program of the Chesapeake Bay Program. Includes reports on consequences and evaluation of nutrient enrichment, nutrient concentration, oxygen concentration, secchi depth, water quality, nutrient processes. Also includes nutrient and sediment load to the tidal Chesapeake Bay system from the lower Bay and James River.

Citation C056

ANON. (1983) Chesapeake Bay: A framework for Action - Appendices. Environmental Protection Agency.

Describes state of the bay, pollutant source loadings, and alternative management strategies for improving the environmental quality of the bay. Includes in the study, nutrients, dissolved oxygen and metal contaminants data.

Citation C057

ANON. (1983) Chesapeake Bay: A profile of environmental change. EPA Appendices.

Water quality data base containing sampling data for physical and chemical constituents in Bay water and tributaries from 1949-1981. Water quality, fecal coliform, organic compounds and toxic compounds were sampled from the water column including analysis of bottom sediments, and shellfish tissues. Includes tables, plots and site locations.

Citation C058

Bender, M. E.; Huggett, R. J. (1977) The effect of Tropical Storm Agnes on heavy metals and pesticide residues from southern Chesapeake Bay: in The Effects of Tropical Storm Agnes on the Chesapeake Bay Estuarine System. CRC Inc. Pub. No. 54, pp. 320-334.

Concentrations of Cd, Cu, and Zn in the eastern oyster Crassostrea virginica were compared for samples collected before and after Tropical Storm Agnes. Sampling areas were the James, Elizabeth, and Nansemond Rivers. Analysis of hard clams, blue crabs, and oysters for chlorinated hydrocarbons and pesticides showed an influx of these compounds. Comparison of residue levels in oysters to pre-Agnes conditiond revealed a decrease in pesticide body burden. Includes distribution and regression plots of Cd, Cu, and Zn in oysters.

Citation C059

Johnson, P. G.; Orters, V. (1976) Distribution of metals in Elizabeth River sediments: EPA 903/9-76-023, Annapolis, Md., 88p.

No annotation

Citation C060

Rule, J. H. (1981) Spatial distribution of heavy metals in sediments from Hampton Roads, Chesapeake Bay, and the inner Virginian shelf: Virginia Journal of Science V. 32, No. 3, 123p.

Selected heavy metals Cd, Co, Cr, Cu, Mn, Ni, Pb, and Zn were sampled from the Elizabeth River, Hampton Roads Harbor, Thimble Shoals, Cape Henry Shipping Channels and the proposed Norfolk Disposal Site for dredged sediments. Metal levels were lowest in the Norfolk Disposal Site sediments and increased in samples taken from the Chesapeake Bay shipping channels, Hampton Roads Harbor and the Elizabeth River in this order.

Citation C061

Also see the following citations:
B058,B072
C027,C028,C053,C054,C057

GEOLOGICAL ANNOTATIONS

by
Dennis L. Lundberg

This portion of the annotated bibliography considers research accomplished in geological oceanography of the lower Chesapeake Bay during the years from 1973 through the present (1983). The specific coordinates are 36° 50′N, 37° 10′N, 075° 50′W, 076° 20′W.

The geological portion is divided into six sections. The citations are arranged chronologically by year within each section and alphabetically by first author within each year group. Citation numbers are added at the end of each citation to facilitate cross referencing. The six sections are as follows:

I Shoreline erosion
II Suspended sediments
III Remote sensing
IV Sediment distribution (*of bottom* sediments)
V Bathymetry and sediment transport
VI Dredging

Resources utilized in the literature search included the libraries at the Virginia Institute of Marine Science and at Old Dominion University. Additionally, a computer search was accomplished using the DIALOG Information Service through the ODU library.The following data banks were searched:

A. National Technical Information Service
B. Oceanic Abstracts
C. COMPENDEX (an engineering index)
D. GEOREF (American Geological Institute)
E. SCISEARCH (Scientific Citations Index)

Key words used in the search were Chesapeake Bay, lower Chesapeake Bay, suspended sediment, sedimentation, sediment transport, erosion, and shoreline. The GEOREF data bank was also entered using the geographic coordinates of the study area.

There has been a relatively large number of studies done under the general heading of shoreline erosion incuding several technical reports that have inventoried the existing conditions of the shoreline as well as several reports and scientific papers that have evaluated the susceptability of the shoreline to erosion. Suspended sediments have also been studied in some detail especially when remote sensing is considered. Many of the in situ measurements of suspended sediments have

been to evaluate and calibrate various remote sensing techniques. In general, remote sensing can be divded into two groups based on the platform used; either satellite or aircraft. There have been relatively few studies done in the last ten years that have considered the over all sediment distribution patterns of the lower Chesapeake Bay. However several studies have considered the distribution patterns in locallized areas. Sediment bed load transport studies have also been limited to local areas as compared to a general pattern of bed load transport in the Bay.

Anon (1973) Annual Technical Report Vol. 2, Wetlands, shorelines, and shallows: CRC Inc. Tech. Rep. No. CRC-PUB-21, 299 p.

The report summarizes shoreline erosion studies in Virginia and Maryland as well as the transport of solids in marsh creeks. Also, the socio-economic and legal studies are described for wetlands management as well as federal programs effecting shoreline development.

Citation G001

Anon (1973) Chesapeake Bay existing conditions report. Appendix C. The Bay--Processes and resources Vol. 1; Corps of Eng. Balt. Distr Rep. No. CHB-002-C-1, 358 p.

Appendix C of the report inventories the impact and value of the water resources in the bay. Volume 1 of Appendix C contains discussions of shoreline erosion, hurricane flooding, navigation, noxious weeds and fish and wildlife.

G002

Kerhin, R. T. (1973) Recognition of beach and nearshore depositional features of the Ches. Bay, in Symposium on significant results obtained from Earth Resources Technology Satellite-1, 3 Volumes.

No annotation

Citation G003

Anon (1974) Interim progress report, NSF/RANN grant GI38973 Volume III. The wetlands/edges program. Research on the Chesapeake Bay to provide a knowledge base for physical alternations of the edges of the Chesapeake Bay: CRC, Inc. Rep. No. NSF/RA/E-74/078, 41 p.

This report presents the design and composition of the program, the technical accomplishments and delivered products relating to development of criteria for incremental alteration to the Chesapeake Bay shoreline and the progress of the shoreline situation report. The goal of the program is to develop information, criteria, and guidelines for the management of physical alteration to the edges of the Chesapeake Bay.

Citation G004

Das, M. M. (1974) Beach erosion study, Little Creek Amphibious Base, Virginia, NAVOCRANO, NSTL Sta., MS, Tech. Rep. No. NOO-TR-248, 78 p.

Data on wave climatology, tidal currents, and historical shoreline changes were used to estimate gross and net longshore sediment transport rate on the Little Creek Amphibious Base. A symmetric tidal flow in the area was assumed.

Citation G005

Byrne, R. J.; Hobbs III, C. H. (1976) Shoreline situation report cities of Chesapeake, Norfolk and Portsmouth: VIMS SRAMSOE 136.

See citation G011 for annotation.

Citation G006

Anon (1977) Chesapeake Bay future conditions report. Vol. 8, navigation, flood control, shoreline erosion: Corps of Engineers, *Baltimore* Dist. Report No. FCR-77-008, 399 p.

Volume 8 has three appendices. Appendix 9 deals with navigation and the importance of waterborn commerce to the Chesapeake Bay region. Appendix 10 deals with the use and development of the shoreline and the natural process of flooding. Both present and future flood prone areas are identified and preventive measures used to prevent or reduce flooding. Appendix 11 is an assessment of area presently affected by shoreline erosion and where areas may be threatened by future development. Recommendations are presented to prevent or reduce erosion.

Citation G007

Fleisher, P.; McRee, G. J.; Brady, J. J. (1977) Beach dynamics and erosion control Ocean View Section, Norfolk, Virginia: Dept. of Ocean., ODU, Norfolk, Va. Tech. Rep. No. 30.

The purpose of the report was to assess the coastal erosion problem at Ocean View and to make recommendatioons as to erosion control, shoreline protection ,and development. Included in the study is: (1) a collection of a data base on dynamic characteristics of the beach; (2) tidal currents off Ocean View;1 (3) characterization of the beach sands; (4) bathymetric survey of the offshore areas; (5) a comparison of 6 bathymetric surveys spanning 121 years; and (6) physical characterization of the waterfront.

Citation G008

Goldsmith, V.; Sturm, S. C.; Thomas, G. R. (1977) Beach erosion and accretion at Virginia Beach, Virginia and vicinity: CERC Misc. Rep. 77-12.

A report on shoreline changes between Cape Henry and the N. Carolina state line. Table 2 contains a summary of a summary of the physical characteristics, ownership, use, development and history of the shoreline including the reach from Willoughby Spit to Cape Henry.

Citation G009

Anon (1978) Chesapeake Bay baseline data acquisition, Appendix XI. Shoreline erosion: EPA, Ches. Bay Program, Rep. No. EPA/903/9-78/030, 346 p.

This report identifies current research programs pertaining to shoreline erosion being conducted in the Chesapeake Bay as well as the researchers envolved. The data files presented are from the Environmental Data Base Directory and includes data from 1973 to the time of the report. Major past, present or planned monitoring programs are also identified.

Citation G010

Byrne, R. J.; Hobbs, III, C. H. (1978) Shoreline situation report city of Virginia Beach: VIMS SRAMSOE 163, 91 p.

This report attempted to give an assessment and integration of the important coastal parameters and characteristics in order to provide aid to planners and managers of the coastal zone. Emphasis was placed on shoreline erosion and recommendations were given about some of the problems. Existing data was used whenever possible. Factors considered are shoreline types, use, wind and sea exposure, ownership, flood hazard, water quality, beach quality, erosion,and shore structures.

Citation G011

Rosen, P. S. (1978) A regional test of the Bruun Rule on shoreline erosion: Mar. Geol. Vol. 7C(1-2), pp. M7-M16.

The Bruun Rule was tested on the beach units along 336 km. of the Virginian Chesapeake Bay shoreline. It was found that the erosion rate predicted fits the long term erosion rate with a 3% error. This demonstrates that sea level rise can account for all shore retreat in the study area.

Citation G012

Rosen, P. S. (1980) Erosion susceptability of the Virginia Chesapeake Bay shoreline: Mar. Geol. 34, pp. 45-59.

The author attempted to define the susceptibility of different shoreline morphologies to erosion. He found that 80% of the shoreline could be classified into three morphologically distinct types with different susceptabilities to erosion. They are (1) permeable beaches which provide the greatest vertical buffer to storm surge and waves; (2) impermeable beaches which the highest mean erosion; and (3) marsh barrier beaches which are less susceptible of these three types. The remaining 20% of the shoreline is classified as marsh margins which are the least erodable.

Citation G013

Oertel, G. F.; Gingerich, K. J.; Byrnes, M. R. (1982) Sediment budget and shore dynamics East Ocean View, Norfolk, Virginia: Dept. of Ocean., ODU, Norfolk, Va. Tech. Rep. No. 82-6, 28 p.

A series of beach profiles was taken at 25 stations over a period of 8 weeks in order to monitor their change with time. A net sediment budget was then determined. The study also revealed cells of net erosion or accretion in the study area.

Citation G014

Anon (1983) Willoughby Spit and vicinity, Norfolk, Virginia hurricane protection and beach erosion control study: U. S. Army Corps of Eng., Feasibility Report and Final E.I.S., 164p.

The study was limited to the shoreline between Willoughby Spit and Little Creek Inlet and was intended to determine areas which are presently or in the future may be subjected to damage by storm tides and waves and the resultant beach erosion. Additionally, suitable plans were developed for protection in the study area. The study included a general description of the local climate and weather conditions and the natural forces that act in the area to produce beach erosion. Past storms and associated damages are summarized. Expected storm damage based upon a frequency analysis of storms and t ides is also put forth. A detailed discussion of the beach erosion problem includes short term studies and studies using historical records from as early as 1850 for shoreline and depth changes.

Citation G015

See also the following citations:
G019,G035,P044

Graban, W. E. (1973) Sediment pattern correlation with inflow and tidal action (Progress Rept.): Army Eng. WES Vicksburg MS Rep. No. NASA-CR-132084, 5 p.

ERTS-1 images of the Chesapeake Bay study area were compared with ground truth data of the same time and location. The analysis showed good correlation between satellite radience values and suspended sediment.

Citation G016

Schubel, J. R. (1975) Effects of Agnes on the suspended sediment of the Chesapeake Bay and contiguous shelf waters: in VIMS SRAMSOE 57, pp. B1-B26.

Suspended sediment was sampled along the entire length of the Chesapeake Bay In the middle and lower Chesapeake Bay the suspended sediment concentration was 2-3 times normal. The outflow from the Bay could be seen as a plume of low salinity, highly turbid water.

Citation G017

Gross, M. G.; Eaton, A. D.; Grant, V. (1977) Biogeochemistry of trace metals in Chesapeake Bay. (Progress Report), 1 July 1976-30 June 1977, 69 p.

This is a progress report on the geochemistry and fate of Fe, Mn, Cu, and Zn in the surface water and sediments in the Susquehanna River and Chesapeake Bay. The path of suspended sediments in Chesapeake Bay and San Francisco Bay is compared.

Citation G018

Schubel, J. R.; Carter, H. H. (1977) Suspended sediment budget for Chesapeake Bay: in Estuarine Processes (M. Wiley, ed.), Vol. II, pp. 48-62.

Suspended sediment distributions along the axis of the Bay indicate that there is a net movement into the Bay from the ocean. The largest single source of inorganic sediment in the lower and middle reaches may be from shoreline erosion. The tributaries to the Bay act as sediment sinks with the exception of the Susquehanna River which discharges directly into the Bay proper.

Citation G019

Bowker, D. E. ; Hardesty, C. A.; Jobson, D. J. (1981) Analysis of testbed airborn multispectral scanner data from Superflux II: in Chesapeake Bay Plume Study, Superflux 1980, NASA Conf. Pub. 2188, pp. 323-337.

It was demonstrated that a multispectral scanner on board a NASA aircraft could effectively monitor suspended sediments and chlorophyll in the water when using the tested algorithm. A map of the Bay plume was produced. It was found that sunglint did not interfere with the mapping and that the algorithm was not sensitive to nadir variations.

Citation G020

Byrnes, M. R.; Oertel, G. F. (1981) Particle size distribution of suspended solids in the Chesapeake Bay entrance and adjacent shelf waters: in Chesapeake Bay Plume Study, Superflux 1980, NASA Conf. Pub. 2188, pp. 223-236.

The primary and secondary particle size modes of suspended solids in 61 water samples at 16 stations indicated the presence of a surface or near surface plume. Water samples were taken at the surface, -3m, -8m, and 1m above the bottom. Three potential sources are runoff, resuspension within the Bay and/or resuspension at the Bay mouth. Resuspension was most likely due to wave and current action.

Citation G021

Gingerich, K. J.; Oertel, G . F. (1981) Suspended particulate matter in Chesapeake Bay: in Chesapeake Bay Plume Study, Superflux 1980, NAVA Conf. Pub. 2188, pp. 199-222.

Water samples collected in the Bay mouth and continental shelf in support of Superflux 1980 were analyzed for total suspended sediment, total suspended inorganics, total suspended organics, percent organics, particle size distribution, and presence or absence of most prominent particle types.

Citation G022

Oertel, G. F.; Wade, T. L. (1981) Characteristics of total suspended matter and associated hydrocarbon concentrations adjacent to the Chesapeake Bay entrance: in Chesapeake Bay Plume Study, Superflux 1980, NASA Conf. Pub. 2188, pp. 251-260.

The objective of this study was to correlate hydrocarbon concentration with suspended matter in order to determine if hydrocarbon concentration could be estimated using remotely sensed suspsended sediment concentration. In general, a good correlation was found.

Citation G023

Ohlhorst, C. W. (1982) Analysis of ocean color scanner data from Superflux III experiment: NASA Langley Res. Cen. Rep. No. NASA-TM-83290; NAS 1.15:83290, 30 p.

Scanner data collected on October 15, 20, and 22, 1980 showed good correlation with chlorophyll a in the Chesapeake Bay waters. No correlation was found between Ocean Color Scanner and total suspended solid measurement.

Citation G024

See also the following citations:
C019,C033
G020,G025,G027,G028,G029,G044
P032,P035

Warren, A. N.; Grabau, E.; Williamson, A. N. (1974) Mapping suspended particle and solute concentrations from satellite data: Army Eng. WES Vicksburg Rep. No. NASA-CR-136786, presented at ASCE Nat'l Water Resources Eng. Mtg. Jan. 1974, 33 p.

No annotation

Citation G025

Fleischer, P.; Gasnik, T. A.; Hanna, W. S.; Ludwick, J. C.; Bowker, D. A.; Witte, W. G. (1976) Correlation of chlorophyll, suspended matter, and related parameters of waters in the lower Chesapeake Bay area to LANDSAT-1 imagery: Inst. of Ocean., Old Dominion Univ. Tech. Rep. No. 28, 125 p.

This study made helicopter and ship measurements of the pertinent water parameters synchronously with LANDSAT over passes to correlate the multispectral LANDSAT imager with the water-parameter. It was found that bands 5-6 were useful in monitoring total particles although a daily calilbration was needed. Band 5 was shown to be useful in monitoring suspended sediment and did not need a daily calibration when atmospoheric corrections were made.

Citation G026

Williamson, A. N. (1978) Movement of suspended particales and solute concentration with inflow and tidal action: Army Eng. Waterways Exp. Sta., Vicksburg, MS, Rep. No. WES-TR-M-78-2, 177 p.

This report discusses techniques developed to correlate optically measured radiance data from LANDSAT with variation in suspended particle and solute concentrations. The method was applied to selected sites in the Chesapeake Bay.

Citation G027

Mundy, J.; Fedosh,M.S. (1980) Southern Chesapeake Bay circulation and suspended sediment transport analyzed using LANDSAT imager: in Assoc. Amer. Soc. Photogr. P., RS3F: pp. 1-5.

No annotation

Citation G028

Bowker, D. E.; Hardesty, C. A.; Jobson, D. J. (1983) Remote sensing of sediment and chlorophyll with the test-bed aircraft multispectral scanner: NASA Rep. No. NAS 1.15: 84590; L-15572; NASA-TM-84590, 26 p.

The test-bed aircraft multispectral scanner (TBAMS) was used to measure upwelled radiances at the Chesapeake Bay entrance. These measurements were then correlated with suspended sediment and chlorophyll a. A three band ratio algorithm was determined to be the best for monitoring these two water parameters because of its insensitivity to variation in the atmosphere and the sun angle.

Citation G029

See also the follow citation:
G003

Firek, F. (1975) Heavy mineral distribution in the lower Chesapeake Bay, Virginia: Dept. of Ocean., ODU, ,Norfolk, VA., MS Thesis. 147 p.

Heavy minerals from 195 bottom samples taken in the lower Chesapeake Bay were studied. Seven geographic provinces were defined. Percentage isoplett maps were prepared for the more common heavy minerals as well as contour maps of mineral ratios. Correlation coefficient matrices and the isopleth maps were used to establish unique mineral suites associated with each province. Factor analysis identified two factors that account for 63% of the variation in the relative amounts of the seven most common heavy minerals.

Citation G030

Shideler, G. L. (1975) Physical parameter distribution patterns in bottom sediments of the lower Chesapeake Bay estuary, Virginia: J. Sed. Pet. Vol. 45, No. 3, pp. 228-237.

Bottom sediments between the Potomac R. and the Atlantic Ocean were analyzed for mud content, sand texture, organic content and color. The distribution pattern revealed a complex dispersal model where sediments have multiple sourcaes. The bay mouth sector south of the York River had multicolored sands and appeared to be a mud by-pass region. Sand textures indicate composite fabric of modern equilibrium sediments and palimpest sediments of an earlier hydraulic region.

Citation G031

Firek, F.; Shideler, G. L.; Fleischer, P. (1977) Heavy-mineral variability in bottom sediments of the lower Chesapeake Bay, Virginia: Mar. Geol., vol. 23 pp. 217-235

Bottom sediment samples were taken at 195 locations extending from the mouth of the Potomac River south to the Bay entrance. Factor analysis identified two factors that accounted for 63% of the variance. The main factor accounted for 44% of the variance and was based on zircon, horneblend, staurolite-pyroxene relationship which suggests mineral stability is a major factor. The second factor (19%) based on tourmaline, epidote, staurolite, garnet relationship suggests provenance is another major cause of variability.

Citation G032

Hobbs, C. K.; Byrne, R. J.; Carron, M. J. (1982) Surficial sediment, Chesapeake Bay, Virginia: AAPG Bull. Amer. Assoc. of Petrolium Geologists Vol.66 No.5, pp. 582-582.

Surface sediments of Chesapeake Bay were found to be sandier than previously reported with 65% of the 2000 samples classified as sands. The mean graphic-mean was 3.15 phi. Distribution is a function of geomorphology with good correlation between depth and sediment type. Several large geomorphic features are distinguishable on maps of sediment types.

Citation G033

Byrne, R. J.; Hobbs III, C. A.; Carron, M. J. (1983) Baseline sediment characteristics and sedimentation pattern of the Virginia portion of the Chesapeake Bay: EPA Ches. Bay Program Report No. EPA-600-/3-83-048, 168 p.

More than 2000 grab samples were analyzed for sediment depositional pattern, physical properties and sedimentation rates in order to provide a framework for studies of toxic substance distribution and concentration. An attempt was also made to develop a sediment budget for the Chesapeake Bay.

Citation No. G034

See also the following citations:
B002,B007,B013,B019,B065
C012,C016,C018,C022,C023,C024,C054,C055,C058,C061
G038,G039,G040,G042

Anon (1973) Chesapeake Bay existing conditions report Appendix D. Map folio. Corps of Eng. Baltimore Dist. Rep. No. CHB-002-0, 111 p.

Appendix D contains maps that supplement appendices B & C and presents variable information of project locations and problem areas described in the other appendices. The plates refer to data on land use, ground water, water supply, recreation, power, beach erosion, navigation, noxious weeds, and fish and wildlife.

Citation G035

Ludwick, J. C. (1973) Tidal currents, sediment transport, and sand banks in Chesapeake Bay entrance, Virginia: Dept of Ocean., Old Dominion Univ. Tech. Rep. No. 16, 11 p.

Twenty-four stations at the north side of the Chesapeake Bay entrance were occupied for periods of 27 hours each. Current speed and direction measurements were taken at 11 different levels. Streamlines of net sediment transport were inferred from this data. It was found that at the headlands net sediment transport is seaward, individual shoals have net transport seaward on one side and landward on the other. Ebb and flow deltas alternate across the entrance.

Citation G036

Wells, J. T. (1973) Particle size distribution and small-scale bed-forms on sand waves, Chesapeake Bay entrance, Virginia: Dept. of Ocean. ODU, MS. Thesis, 110 p.

The relationship between sediment characteristics and topography was studied along five series of sand waves in the entrance to Chesapeake Bay. Results indicate there are two types of sand waves with regard to mean grain size. An analysis of variance was used to verify textural trends. The textural differentiates are explained as the result of a time distribution of competent velocity for bed-load transport.

Citation G037

Ludwick, J. C. and Wells, J. T. (1974) Particle size distribution and Small-scale bed-forms on sand waves, Chesapeake Bay entrance. Dept. of Ocean., ODU, Tech. Rep. 12, 112 p.

The relationship between sediment texture and topography was studied along five series of sand waves in the Chesapeake Bay entrance. Two types of distributions are present; one with course sediment on the crests and fine in the trough; the second with course sediment in the trough and fine on the crest.

Citation G038

Granat, M. A. (1976) Dynamics and sedimentology of Inner Middle Ground-Nine Foot Shoal, Chesapeake Bay, Virginia: Dept. of Ocean., ODU, Norfolk, Virginia, MS Thesis, 150 p.

Availble data indicate that Inner Middle Ground-Nine Foot Shoal is in quasi-equilibrium with mutually evasive ebb and flood tidal currents. Eight current meter stations were used to determine near surface and near bottom tidal current asymmetries and directions. Boundary shear stress and sediment transport was calculated for pseudo-synoptic vertical velocity profiles. Cluster analysis was used to determine optimum natural groupings of sediments.

Citation G039

Brush, E. R. (1978) The relationship of bottom sediments to the current-generated topography on Crumps Bank and Willoughby Bank, southern Chesapeake Bay, Virginia: Dept. of Ocean., ODU, Norfolk, VA, MS Thesis, 94 p.

The purpose of the study was to determine the relationship of bottom sediments in the study area to the topography and that the topography is a result of tidal currents. To this end, bathymetry, bottom sediment characteristics, bottom tidal currents, and the correlation of depth to sediment parameters was studied. Tidal currents around Crumps Bank and Willoughby Bank are sufficient to transport sediment and is enhanced in shallow areas by wave action. These features are formed by mutually evasive ebb and flood tidal currents. It is suggested that man's activities around Thimble Shoal and the bridge tunnel has disrupted the sediment.

Citation G040

Carron, M. (1979) The Virginia Chesapeake Bay: recent sedimentation and paleodrainage: VIMS Ph.D. Diss., 83 p.

There are two parts to this dissertation, the first deals with sedimentation rates derived from the comparison of bathymetric surveys from 1850 to 1950. A significant relationship was found between water depth and sedimentation rate, with higher rates of sedimentation for shallow (0-2 m) and intermediate depth (6-13 m) and lower rates in deep water (>13 m) and between depths of 2-6 m.

Citation G041

Ludwick, J. C. (1979) An analysis of bathymetric change in lower Chesapeake Bay: Dept. of Oceanog., ODU, Tech. Rep. No.39, 43 p.

The study area is approximately centered on the Thimble Shoal Channel in the lower Chesapeake Bay. Bathymetric charts from 1854 and 1978 were compared to determine net sedimentation rates and bathymetric changes. The lateral shift of a previously unreported feature named the Beach Channel appeared to influence beach erosion at Ocean View. Charts with bottom sediment type are included in the analysis.

Citation G042

Granat, M. A. and Ludwick, J. C. (1980) Perpetual shoals at the entrance to Chesapeake Bay: flow-substrate interaction and mutually evasive net currents: Mar. Geol. V. 36, pp. 307-323.

The Inner Middle Ground Nine Foot Shoal in the entrance to Chesapeake Bay is shown by the author to be in quasi-equilibrium as indicated by the bathymetric development, sedimentological make-up and the hydrodynamics of the region. The development of the shoal was revealed by comparing six surveys over the past 127 years. The sedimentological make-up was derived from the principal component and cluster analysis of 75 surface sediment samples and the hydrodynamic environments from 8 current meter stations over the shoal.

Citation G043

Ludwick, J. C. (1981) Bottom sediments and depositional rates near Thimble Shoal Channel, lower Chesapeake Bay, Virginia: Geol. Soc. of Amer. Bull. V92, N7, p. 496-506.

Comparison of bathymetric charts from 1854 to 1978 in a 205 km^2 area encompassing Thimble Shoal channel reveal that the net depositional rate is 3.7 mm/yr excluding the channel. The net depositional rate is 9.5 mm/yr on the north flank of the channel and is 6.5 mm/yr on the south flank. The volume of dredged material from the channel shows a depositional rate of 67 ± 22 mm/yr. Tail of the Horseshoe Shoal to the north of the channel appear to be migrating southward contributing to the infilling of the channel. Additionally, model estimates indicate that in filling by settling from suspension is of equal magnitudes as bed-load transport from the north.

Citation G044

Perillo, G. M. E. (1981) Geomorphology and dynamics of a sand wave in lower Chesapeake Bay, Virginia: ODU Ph.D. Diss., 208 p.

The morpoholology, sedimentology, and dynamic processes of a single sand wave within a sand wave field were intensively studied. Sediment textural parameters and a multivariate analysis technique revealed the different subenvironments of the sand waves and box core samples revealed the internal structure. Shear stress data at 5 cm above the bed revealed these components: (1) long period trends, (2) wave associated events, and (3) turbulence.

Citation G045

See also the following citation:
G008

Anon (1973) Thimble Shoal maintenance dredging (Final Environmental Impact Statement): Army Eng. Norfolk Dist. Rep No. ELR-73-1471, 34p

This report summarizes the projected impact of dredging the Thimble Shoal channel. Local turbidity is expected to increase due to the release of sediment into the water. Temporary turbidity and siltation will have only minor effects in the area of the dredging and depositional sites

Citation G046

Schubel,J.R. ; Carter, H.H.; Pritchard, D.W.; Weyl,P.K.; Wise,W.M. (1979), A conceptual framework for assesing dredging/disposal options in the Chesapeake Bay: NOAA Tech Rep. No. SR; Ref-79-8; NOAA-80031212, 16p.

This report attempted to identify specific research needs pertaining to dredged material management in the Chesapeake Bay.

Citation G047

Gross,M.G.; Cronin,W.B. (1975), Dredging and dispoal: in Chesapeake Bay, 1975-2025, Johns Hopkins Univ. Ches. Bay Inst., pp 131-145

No annotation

Citation G048

Also see the following citations:
C028,C031

PHYSICAL ANNOTATIONS

by
Dennis L. Lundberg

This portion of the annotated bibliography considers research accomplished in physical oceanography in the lower Chesapeake Bay during the years from 1973 through the present (1983). The specific coordinates are given in the section on geological oceanography.

The physical oceanography portion is divided into five sections. The citations are in the same format as the geological oceanography section. The sections are:

- I Circulation
- II Temperature and salinity
- III Tides and currents
- IV Models
  - A Tide
  - B Storm surge and waves
- V Remote sensing
- VI Miscellaneous

The resources utilized were the same as those in the Geological Oceanography section. The data banks searched are slightly modified and are listed below:

- A. National Technical Information Service
- B. Oceanic Abstracts
- C. COMPENDEX
- D. SCISEARCH

Key words used were Chesapeake Bay, lower Chesapeake Bay, circulation, tides, waves, temperature, and salinity.

There have been relatively few measurements of the general circulation patterns of the lower Bay area. However several studies have envolved occupying current meter stations to determine the local variations in the current speed and direction. The general conclusion of most studies is that both the general circulation pattern and the local currents are tidally dominated, as one would expect. Much of the research concerning circulation and tidal variations has been the result of computer and physical models. Models have also been used to estimate the change in salinity and temperature within the bay as well. The remote sensing has included circulation, temperature, salinity, and fronts within the Bay, at the Bay mouth, and the shelf region near the Bay mouth.

Johnson, R. E. (1976) Circulation study near Cape Henry, Virginia using Lagrangian technique: Dept. of Ocean., ODU Tech. Rep. No. 21.

A circulation study from the entrance of Chesapeake Bay mouth to Rudee Inlet, Virginia Beach.

Citation P001

Wang, D-P; Elliott, A. J. (1978) Non tidal variability in the Chesapeake Bay and Potomac River: evidence for non-local forcing: J. Phys. Oc. vol.8, pp.225-232.

The relationship of atmospheric forcing to non-tidal variability in the Chesapeake Bay and Potomac River was studied using two month sea level and bottom current measurements. The dominant sea level change had a period of 20 days and was related to coastal sea level changes generated by along shore winds. Periods of 5 and 2.5 days were significant. The 5 day fluctuations were driven by coastal sea level changes and lateral winds (east-west). The 2.5 day fluctuation was the result of longetudinal (north-south) winds over the Bay.

Citation P002

Wang, D-P (1979) Subtidal sea level variations in the Chesapeake Bay and relation to atmospheric forcing: J. Phys. Oc. ,vol.9, pp.413-421.

Subtidal sea level variations were examined for one year for evidence of wind-driven barotropic circulation in the Chesapeake Bay. The results suggest that barotropic motion is an important part of the net circulation in the Bay. The associated sea level changes contribute significantly to storm surge. The study suggests that the barotropic response be carefully studied for better understanding of dispersion processes and storm surge in Chesapeake Bay.

Citation P003

Hilder, F. P. (1980) Surface circulation and horizontal diffusion processes of lower Chesapeake Bay.

The surface circulation in an area north of Thimble Shoal, southwest of Chesapeake Channel and west of the Chesapeake Bay Bridge & Tunnel was conducted using buoyed drogues. After the local wind effect was removed, the surface current appeared to be rotary, with a clockwise rotation and was tidally dominated. The horizontal diffusivity appeared to confirm the "4/3 power law" of Richardson's neighbor diffusivity concept.

Citation P004

Boicourt, W. C. (1981) Circulation in the Chesapeake Bay entrance region: estuary-shelf interaction: in Chesapeake Bay Plume Study Superflux 1980, NASA Conf. Pub. 2188, pp. 61-78.

The author measured the tidal height, salinity, temperature and current velocity in the C. B. entrance and inner shelf region. Flow measurements to the mouth of the Thimble Shoal channel showed an unexpected strong outflow.

Citation P005

See also the following citations:
B032
G028
P018,P022,P025,P026,P031,P032

Beauchamp, R. G. (ed.) (1974) Marine environmental planning guide for the Hampton Roads/Norfolk Naval operation area: NAV OCEANS Spec. Pub. No. 250, 262 p.

Presents climatological data on wind, waves and currents for the Chesapeake Bay entrance and offshore operating area. Models are then presented to predict dispersion of sediments, pollutants and plankton.

Citation P006

Kuo, A. Y.; Ruzecki, E. P.; Fang, C. S. (1975) The effects of Agnes flood on the salinity structure of the lower Chesapeake Bay and contiguous waters: in VIMS SRAMSOE 57, Vol. II, pp. A77-A109.

This report monitored the transient response of the salinity distribution in the lower Chesapeake Bay extending from the Bay mouth up to the mouth of the Potomac River. The Bay was treated as a two layered partially mixed estuary.

Citation P007

Ruzecki, E. P.; Hargis, W. J. (1975) Effects of flooding on a coastal plain estuary: Coastal Eng. Conf., 14th Int. Proc., pp. 2451-2470.

An investigation into the flooding caused by Tropical Storm Agnes in the Chesapeake Bay showed that the salinity structure had a four stage reaction. Tides in the lower reaches were unaffected and returned to normal after a short period of continuous ebbing. The salinity distribution returned to normal 100 days after the flood crest.

Citation P008

Schubel, J. R.; Carter, H. H.; Cronin, W. B. (1975) Effects of Agnes on the distribution of salinity along the main axis of the Bay, and in contiguous shelf waters: in VIMS SRAMSOE 57, Vol. 2, pp. A1-A35.

The heavy rainfall associated with Hurricane Agnes greatly affected the salinity of the Chesapeake Bay. Salinities were lower than any previously reported in the surface layer. The large freshwater input and the compensatory upstream flow of the bottom saline water produced large vertical gradients. The lower bay was subjected to pulses of freshwater that entered at different times and locations. The data gathered was used to verify several models. Measurements were taken along the entire length of the bay.

Citation P009

Ruzecki, E. P. (1981) Temporal and spacial variations of the Chesapeake Bay plume: in Chesapeake Bay Plume Study, Superflux 1980, NASA Conf. .Pub. 2188, pp. 121-130.

This report is an analysis of the variation in shape and location of the Bay plume with the change in tidal stage and freshwater inflow. Temperature and salinity data was collected from the Bay mouth into the continental shelf in order to define the Bay plume.

Citation P010

See also the following citations:
B018,B021,B046,B052,B053,B059,B065,B075,B078
C019,C026,C033,C035,C037,C038,C039,C040,C042,C045,C052
P005,P013,P016,P024,P033,P034,P037

Ludwick, J. C. (1974) Variations in boundary drag coefficient in the tidal entrance to Chesapeake Bay, Virginia: Dept of Ocean. Old Dominion Univ., Tech. Rep. 19,. 13 pp.

This paper tested the validity of using the quadratic shear stress law to estimate boundary drag by measuring the velocity profile and then estimating the drag coefficient. It was found that in the entrance to the Chesapeake Bay the drag coefficient varied over four orders of magnitude. It was concluded that this variability limits the usefullness of the quadratic shear stress law in marine sediment transport studies.

Citation P011

Ludwick, J. C. (1975) Variations in the boundary drag coefficient in the tidal entrance to Chesapeake Bay, Va: Mar. Geol. vol. 19, pp. 19-28.

The drag coefficient 100 cm above the bed (C_{100}) at the entrance to Chesapeake Bay was found to range between 3.5 x 10^{-3} and 5.4 x 10^{-2} with a mean of 1.3 x 10^{-2}. The data suggests that C_{100} changes continuously when there is a moveable bed, a size hierarchy of mobile bed forms, time varying flow, and a lack of equilibrium between flow and the bed. Accurate evaluation of boundary shear stress requires the measurement of velocity profiles.

Citation P012

Michael, J. A. (1975) A report on the prototype current velocity and salinity data collected in the middle and lower Chesapeake Bay for the Chesapeake Bay Model Study: Chesapeake Bay Institute, Johns Hopkins Univ. Spec. Rep. 41.

A description of the current velocity and salinity data for the middle and lower Bay. The report contains a description of the data collection methods and reduction. The appendices contain a detailed tape file description.

Citation P013

Neilson, B.; Fang, C. J. (1975) A hydrographical and water quality study during the construction of second Hampton Roads bridge-tunnel: VIMS TD 370 N3.

In addition to water quality, this report gives a general description of the tidal flow in the Hampton Roads area. An estimation of the effect of the second bridge-tunnel is made.

Citation P014

Hoffman, J. F. (1980) Investigation into deep-draft vessel berthing problems at selected U. S. Naval Facilities: EG & G Washington Analytical Service Center, Inc., Rockville, MD 20850.

An investigation of shoaling in pier slips and waterways of six harbors used by the U. S. Navy includes the Naval Station at Norfolk, VA. It pointed out the lack of current velocity measurements in the Naval Station, Norfolk area and that velocities are often derived from models. Shoaling rates are given for various piers.

Citation P015

Scheffner, N. W. ; Crosby, L. G.; Bastian, D. F.; Chambers, A. M.; Grant, M. A. (1981) Verification of the Chesapeake Bay model/Chesapeake Bay hydraulic model investigation: U. S. Army Engineers Waterways Experiment Station Tech. Rep. HL-81-14, 275 p.

The report includes measurement of tidal height, current velocities and salinities used in the verification of the Chesapeake Bay Hydraulic model. An excellent verification of the model was achieved (Author).

Citation P016

See also the following citations:
G005,G036,G039,G040,G043,G045
P006,P021,P024,P035,P037

Lewis, J. K. (1975) The analysis of short term tidal data, VIMS Masters Thesis.

The author developed a method to analyze and predict tidal information using short data series (<15 days). The method uses Fourier analysis of storm and tidal potential theories. The method is then applied to data from the Hampton Roads area of the James River.

Citation P017

Stanley, E. A. (1976) A two-dimensional time-dependent numerical model investigation of the coastal sea circulation around the Chesapeake Bay entrance. VIMS Ph.D. Diss.

The author developed a model that vertically integrated continuity, momentum and mass balance equations.

Citation P018

Blumberg, A. F. (1977) Numerical tidal model of Chesapeake Bay: J. Hyd. Div. ASCE vol. 103 HY1, pp. 1-10.

The author describes a two-dimensional numerical model for tidal dynamics in the Chesapeake Bay. The model concerns mass, energy and momentum and excludes dissipation. The model detected residual eddies. A bottom friction coefficient of 0.0025 and Chezy C of 0.63 meter$^{1/2}$ sec.$^{-1}$ proved to be best when the model was applied to Chesapeake Bay and compared with measured observations. The finite element method used allowed boundary conditions to be easily specified and used a small amount of computer time.

Citation P019

Blumberg, A. F. (1977) On the dynamic balances of the Chesapeake Bay Waters: Ches. Sci., Vol. 18, No. 3, pp. 319-323.

The results of this two-dimension mathematical model using vertically integrated equations showed that the coriolis force and advective terms could not be neglected. Additionally, a bottom friction coefficient of 0.0025 gave the best results when compared to observed tidal data.

Citation P020

Cerco, C. F.; Kuo, A. Y. (1977) A water quality model of the Elizabeth River: VIMS SRAMSOE Rep. 149.

The authors present a numerical model of the Elizabeth River. The model considers the tidal height and tidal current velocities as well as several parameters affecting water quality. The report includes a verification and calibration of the model with field measurements.

Citation P021

Chen, H. S. (1978) Hydrodynamic and biogeochemical water quality models of Hampton Roads: Va. Inst. of Mar. Sci. SRAMSOE 147.

This is a verification and calibration of a numeric model developed by the author to predict circulation and water quality of the lower James River.

Citation P022

Bastian, D. E. (1980) The salinity effects of deepening the dredged channels in the Chesapeake Bay: Institute for Water Resources, Fort Belvoir, Va, Rep. No. IWR-NWS-81-81, 15 p.

The Chesapeake Bay hydraulic model was used to simulate the effect of increasing channel depth from 13 m to 15 m. The result clearly showed the effects on the salinity time history as a result of the change in geometry and tidal discharge. The study included the area from the Bay mouth to Baltimore.

Citation P023

Ricardo, D. R.; Gulbrandsen, L. F. (1982) Low freshwater inflow study Chesapeake Bay hydraulic model investigation: Waterways Experimental Station, Vicksburg, MS, Rep. No. WES/TR/HL-82-3, 197 p.

A report of the results of a base test when drought condition of 1963-1966 was simulated in the model. Historical tide, current and salinity data was used to calibrate the base test. A future test was then run to simulate expected losses due to increase freshwater use 50-60 years into the future in conjunction with the drought condition of 1963-1966.

Citation P024

Shubinski, R. P.; Walton, R. (1982) Chesapeake Bay modeling; in Two Dimensional Flow Modeling, Proceedings of Nat´l. U. S. Army Corps of Eng. Sponsored Seminar on Two Dimensional Flow Modeling.

A three dimensional model to simulate circulation in the Chesapeake Bay has been developed as part of EPA´s Chesapeake Bay Program. It is developed as a management tool and is designed to be flexible and to link with future water quality, sedimentation and ecosystem models of the bay.

Citation P025

Wang, D.-P.; Hamilton, P.; McDonald, K. B. (eds.) (1980) Observation and modeling of the circulation in the Ches. Bay: in Estuarine and Wetland Processes with Emphasis on Modeling, pp. 35-48

No annotation

Citation P026

Chao, Y. Y. (1974) Wave refraction phenomena over the continental shelf near the Chesapeake Bay entrance: CERC Rep. No. CERC-TM-47, 54 p.

A computer refraction program was written that is specialized to the region near the Chesapeake Light Station. It is based on refraction equations that account for the effects of bottom topography and spherical earth effects and corrected to the mercator projection. A change of mesh size is allowed to meet changes in topographic scale.

Citation P027

Rosen, P. S.; Goldsmith, V.; Richardson, W.; Sutton, C. (1977) Chesapeake Bay wave forecast-refraction model: VIMS, SRAMSOE No. 89

No annotation

Citation P028

Boon, J. D.; Welck, C. S.; Chen, H. S.; Lukens, R. J.; Fang, C. S.; Ziegler, J. M. (1978) Storm surge height-frequency analysis and model prediction for the Chesapeake Bay: Vol I, VIMS SRAMSOE 189.

This is an evaluation and field comparison of the model that was presented in Vol. II. The model was verified against (1) analytical solutions of a simple case; (2) astronomical tides in an estuary; (3) astronomical tides in the Chesapeake Bay and (4) observed surge in the Chesapeake Bay due to a particular storm event.

Citation P029

Chen, M. S. (1978) A finite element storm surge analysis and its application to a bay-ocean system: Vol. II, VIMS SRAMSOE Rep. No. 189.

This report presents a two dimensional storm surge model that contains a hydrodynamic model and a hurricane model. The hydrodynamic model is based on the equation of continuity and momentum and the hurricane model expresses atmospheric pressure and wind fields in terms of hurricane parameters and in a semi-empirical in nature. The model is applied to the Chesapeake Bay.

Citation P030

Munday, J. C.; Gordon, H. H.; Welch, C. S.; Williams, G. (1976) Applications of remote sensing to estuarine management (Annual Report), VIMS Rep. No. NASA-CR-148826, 138 p.

Projects for sewage outfall siting in the lower Chesapeake Bay wetlands are reported. A dye-buoy/photogrammetry and remote sensing technique was employed to gather circulation data for outfall siting. This method is inexpensive, gives quick results and shows the Lagrangian circulation. Sequential CR images of inlet basins was used to determine tidal prisms.

Citation P031

Smith, M. H. (1976) Feasibility of monitoring flow patterns and sediment and pollutant dispersion of water bodies with 24 channel spectral data, Army Eng. WES, Vicksburg, MS, Rep. No. WES-MP-M-76-10, 64 p.

The objective of this report was to develop data-handling procedures to transform digital data collected by an airborne sensor into radiance values and then to produce images free of skew and reflectance geometry distortion. Data is collected over the Chesapeake Bay with special attention to the Rappahannock River.

Citation P032

Hans-Juergen, C. B.; Kendall, B. M.; Fedors, J. C. (1977) Sea-surface temperatures and salinity mapping from remote microwave radiometric measurement of brightness temperatures: NASA, Langley Res. Cen., Rep. No. NASA-TP-1077; L-11763, 29 p.

This paper reported the results of a dual frequency microwave radiometer system used to remotely measure temperature and salinity. Accuracies were 1°C and 1 part per thousand for salinities over 5 parts per thousand. Contour maps of temperature and salinity were presented that had a spacial resolution of 0.5 km.

Citation P033

AD-A165 064 ANNOTATED BIBLIOGRAPHY OF THE LOWER CHESAPEAKE BAY: CURRENT LITERATURE OF.. (U) OLD DOMINION UNIV NORFOLK VA APPLIED MARINE RESEARCH LAB A BUTT ET AL. 31 JAN 84 2/2

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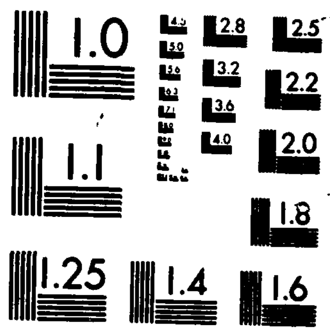

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Kendall, B. E. (1981) Remote sensing of the Chesapeake Bay plume salinity via microwave radiometry: in Chesapeake Bay Plume Study, Superflux 1980, NASA Conf. Pub. 2188, pp. 131-140.

The report briefly describes the theory of passive sensing of the surface salinity using a microwave radiometer. Included is a discussion of the results of the Superflux 1980 experiment. The sensor operated in the L-band. Salinities were derived by combining the microwave sea-surface temperature brightness and the infrared radiometer temperature and inverting.

Citation P034

Munday, J. C.; Fedosh, M. S. (1981) Chesapeake Bay plume dynamics from LANDSAT: in C. B. Plume Study, Superflux 1980, pp. 79-92

81 LANDSAT images of lower Chesapeake Bay were analyzed using visual and enhanced imagery in order to determine where Chesapeake Bay plume was located and to determine effects of tides and winds on plume dynamics. A strong turbidity pattern was observed adjacent to Fisherman's Island during flood. This was a result of the shallow water and flood dominance in that area. Less turbidity was observed at the south entrance because of the deeper waters there and the coriolis effect decreasing the stages of flood.

Citation P035

Sarabun, C. G., Jr. (1981) Mapping watermass boundaries using fluorosensing LIDAR: in Chesapeake Bay Plume Study, Superflux 1980, NASA JConf. Pub. 2188, pp. 141-157.

The results of the initial utilization of the Airborn Oceanographic LIDAR (AOL) to map watermass boundaries in the lower Chesapeake Bay and continental shelf are presented. They are compared with the passive L-band salinity map of the same area. A direct comparison with in situ measurements was not performed.

Citation P036

See also the following citation:
C008 G016

Bumpas, D. F.; Lynde, R. E; Shaw, D. M. (1973) Physical oceanography: in Coastal and offshore environmental inventory Cape Hatteras to Nantucket Shoals: Chap. 1 Marine Experimental Station, Univ. of Rhode Island.

Includes a general discussion of the tides, salinity, and temperatures in the Chesapeake Bay and other estuaries of the east coast.

Citation P037

Feister, Carol; Karweit, M. (1973) Data bank inventory. Volume II. Chesapeake Bay Edition 1, 1949 through 1970, Ches. Res. Inst., Rep. No. REF-73-5, 54 p.

This report describes the Chesapeake Bay portion of the data bank maintained by the Chesapeake Bay Institute (CBI). It has been collated in such a manner as to increase its utilization by other investigators. The data consists of all oceanographic data collected by the CBI.

Citation P038

Ulanowicz, R. E. (1976) Modeling the Chesapeake Bay and tributaries; a synopsis: Ches. Sci., Vol. 17, No. 2, pp. 114-122.

The author presents an overview of modeling of the Chesapeake Bay up to that date. He discusses physical and analytical models as well as one, two, and three dimensional numerical models.

Citation P039

Thompson, E. G. (1977) Wave climate at selected locations along U. S.
coasts: CERC Tech. Rep. 77-1, p.

The data base uses data collected since 1948. The various data collection and recording methods and instruments are compared. Presented are summaries of 19 gage locations including the Chesapeake Bay Bridge-Tunnel. Descriptions of wave gages and records are provided as well as the analytic methods used.

Citation P040

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